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MACWORLD

The Macintosh® Magazine

November 1991 $3.95 Canada $4.95

EASTERN REGIONAL

All About Networking

How to avoid problems as your network grows

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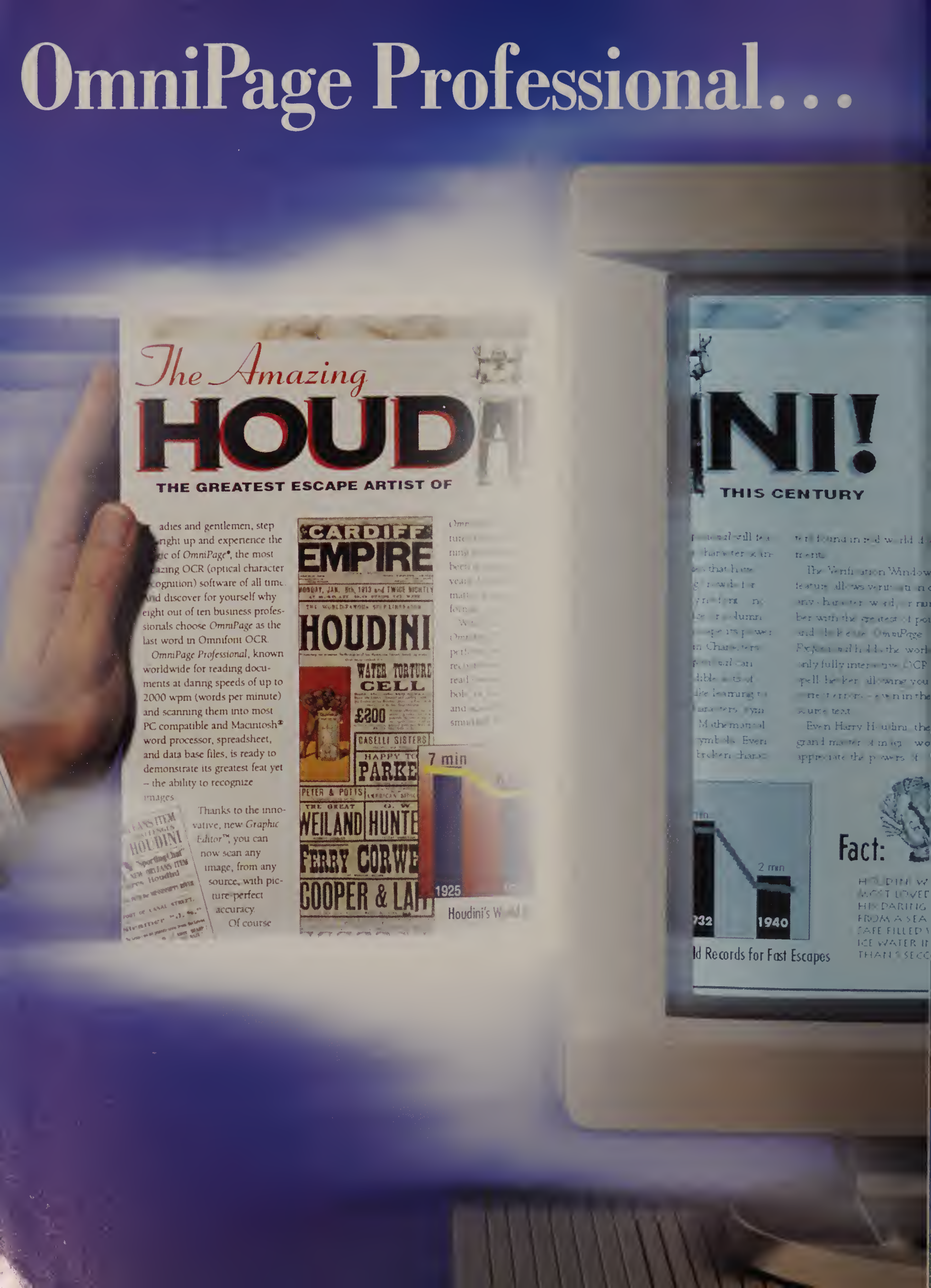
Optical Character Recognition

OmniPage Professional...



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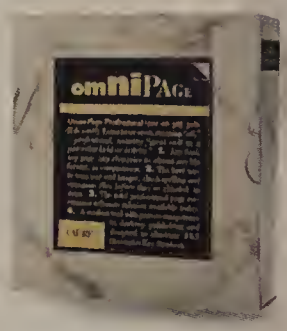

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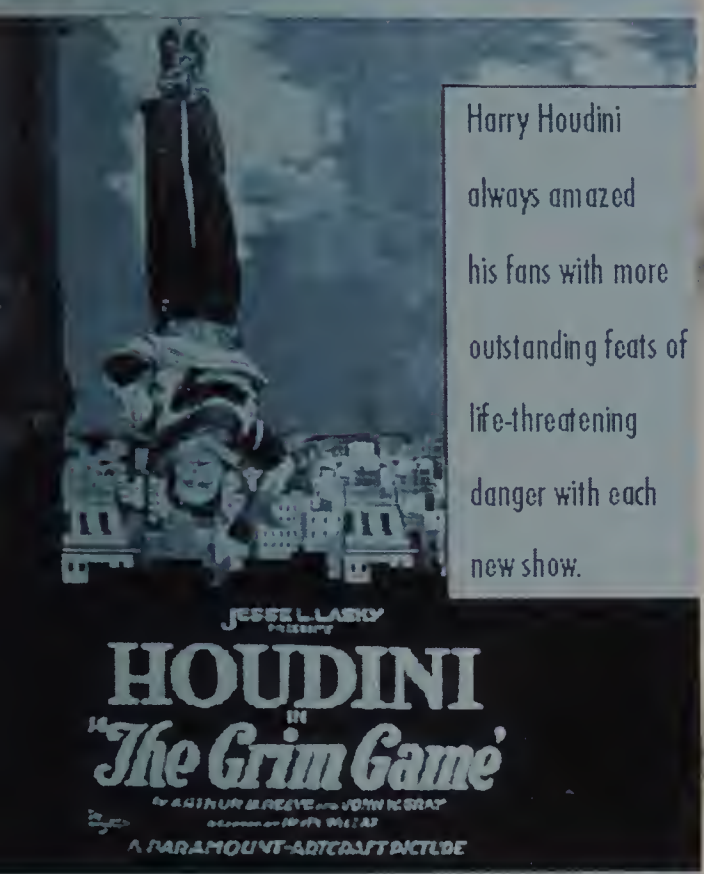

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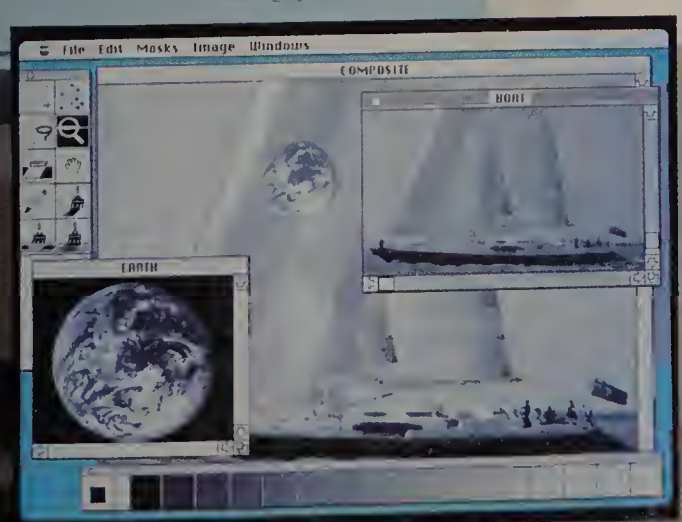

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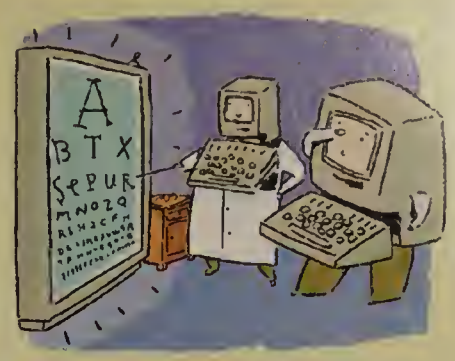

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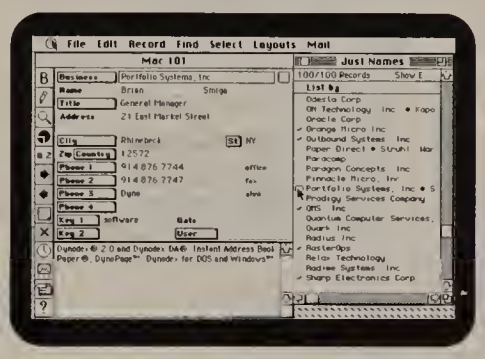

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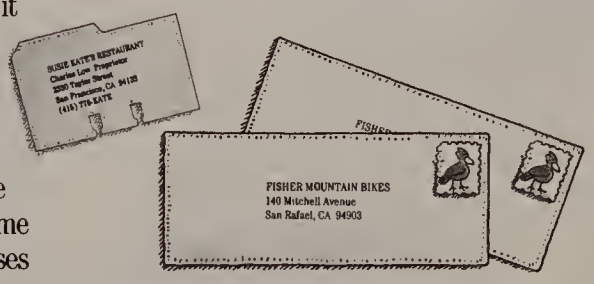

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November 1991, Volume 8, Number 11
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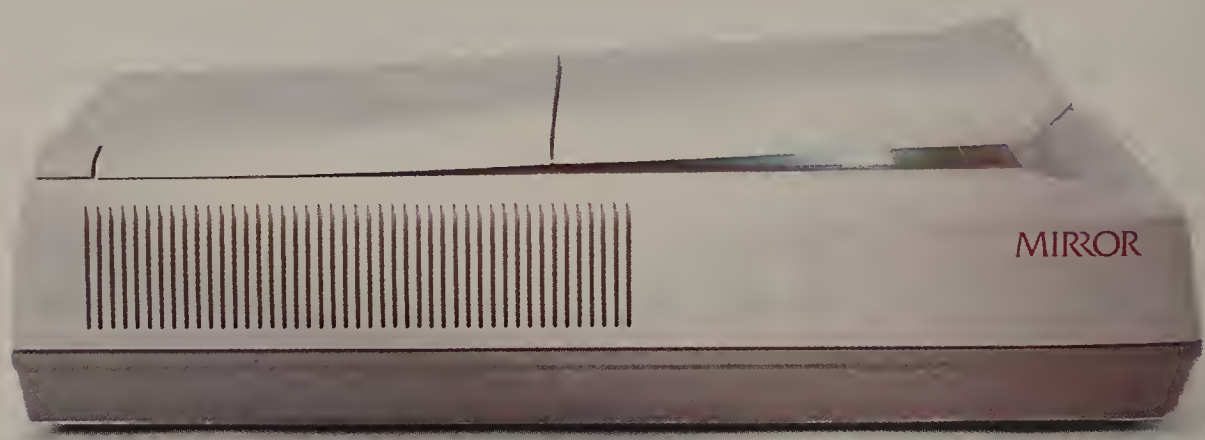

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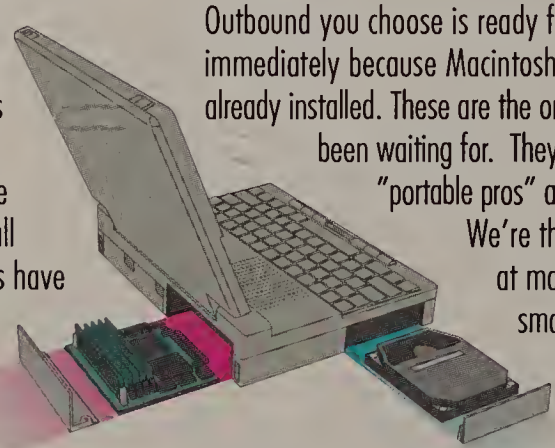

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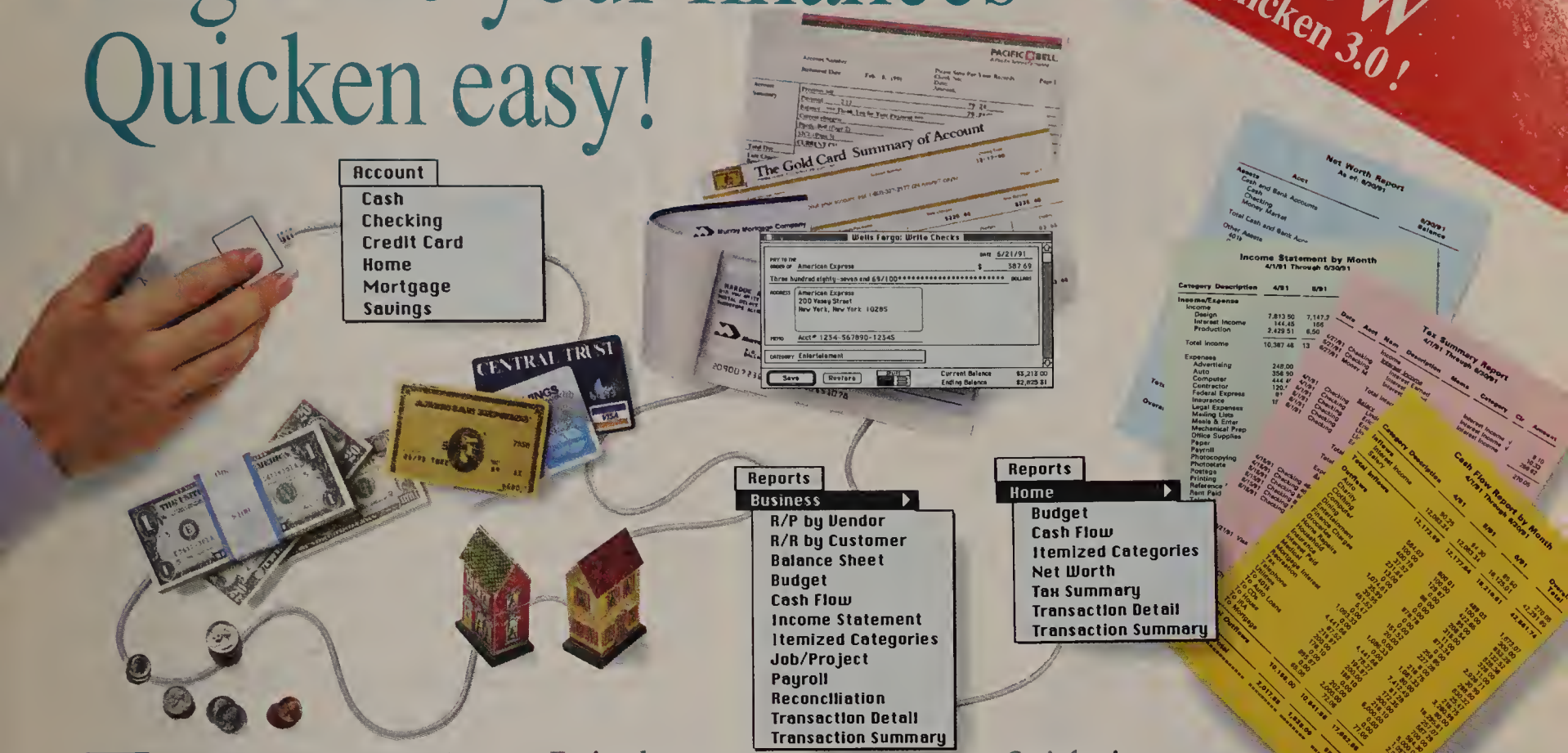

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They laughed when database, but every

Okay, so maybe I'm not in MIS, but I grinned and loaded FoxBASE+/Mac.

The next day, I showed them a sample of their PC inventory database with not just how much of anything we had, but with pictures showing exactly what it looked like.

I ran their dBASE sales analysis program (using a couple of new Mac screens I whipped out) as they watched FoxBASE+/Mac scream through the numbers.

And then I showed them the kinds of reports they could get, using data stored in Fox or dBASE IV/III+ files on the PC.

You could have heard a pin drop.

Then they were all over me with questions, so I just handed them the FoxBASE+/Mac manuals and smiled.

Besides not being in MIS, I'm not a professional programmer, so you can tell how easy FoxBASE+/Mac is.

For the inventory system, I just used

I brought in my own one's smiling now.

FoxBASE+/Mac to read the database files they had on the PC (it reads Fox and dBASE IV/III+ files directly). I added a memo field into which I cut and pasted pictures that our DTP department had for our customer literature. Then I used the MacDraw-like screen painter to create a great color Mac output screen.

The sales analysis was easy, too. I had to create new screens but FoxBASE+/Mac ran the rest of the dBASE III+ program just fine. (It typically runs as much as 95% of standard FoxBASE+/PC and dBASE III+ code with no changes.)

And I built the reports I showed them from scratch. With no programming at all.

If you're looking for a better way to manage your data, call Fox Software and ask for their free demo. It limits the number of records you can store, but is the full program, so you can check it all out for yourself on your applications.

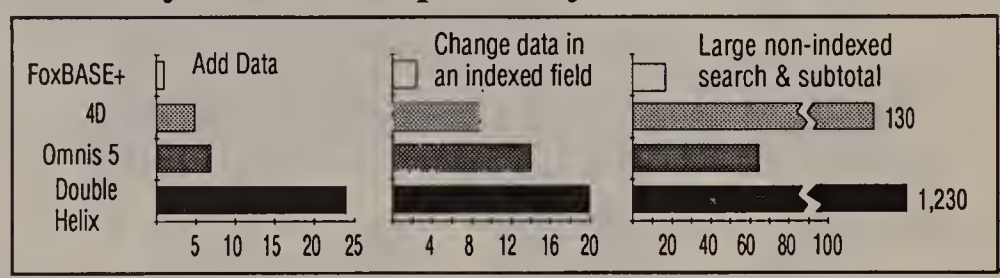
Around here, MIS has been pretty busy the last few weeks. They've hooked up Macs and PCs on an Ethernet network and our information and data processing systems are looking great.

They're building Hypercard-like applications I see people using all over the place.

Accounting likes all of this because the single-user version lists for $495, and the unlimited Multi-User version is only $695.

And even the PC programmers are happy. I hear them talking about things like the great trace and debugging facilities, adding XCMDs and XFCNs, the dBASE-like programming language, System 7 compatibility, full file and record locking in the multi-user version, and how FoxBASE+/Mac is "so astoundingly fast for a Mac."

Everyone seems to be laughing more now, too.



As MacUser said, with FoxBASE+/Mac "data handling is extremely fast."

Call 1-800-837-FOX2 or 419-874-0162 today for a free, full-featured demo.

(Ask for Offer MWD-1101)

FoxBASE+/Mac™

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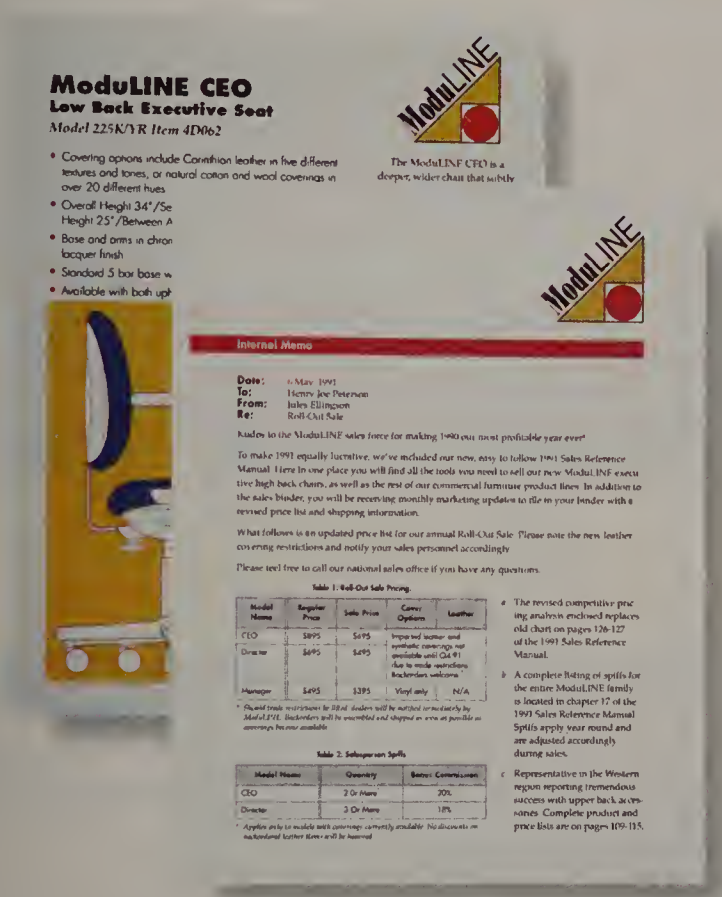

ModuLINE CEO
Low Back Executive Seat
Model 225K/YR Item 4D062

- Covering options include Corinthian leather in five different textures and tones, or natural cotton and wool coverings in over 20 different hues
- Overall Height 34"/Se Height 25"/Between A
- Base and arms in chron lacquer finish
- Standard 5 bar base w
- Available with both upl

The ModuLINE CEO is a deeper, wider chair that subtly

Internal Memo

Date: 6 May 1991
To: Henry Joe Peterson
From: Jules Ellington
Re: Roll-Out Sale

Kudos to the ModuLINE sales force for making 1990 our most profitable year ever!

To make 1991 equally lucrative, we've included our new, easy to follow 1991 Sales Reference Manual. Here in one place you will find all the tools you need to sell our new ModuLINE executive high back chairs, as well as the rest of our commercial furniture product lines. In addition to the sales binder, you will be receiving monthly marketing updates to file in your binder with a revised price list and shipping information.

What follows is an updated price list for our annual Roll-Out Sale. Please note the new leather covering restrictions and notify your sales personnel accordingly.

Please feel free to call our national sales office if you have any questions.

Table 1: Roll-Out Sale Pricing.

Model Name	Regular Price	Sale Price	Covering Options	Leather
CEO	$895	$695	Imported leather and synthetic coverings not available until Q4 91 due to trade restrictions. Backorders welcome.	
Director	$695	$495		
Manager	$495	$395	Vinyl only	N/A

* Should trade restrictions be lifted, dealers will be notified immediately by ModuLINE. Backorders will be assembled and shipped as soon as possible as coverings become available.

Table 2: Salesperson Spiffs

Model Name	Quantity	Extra Commission
CEO	2 Or More	20%
Director	3 Or More	18%

* Applies only to models with coverings currently available. No discounts on unbundled leather items will be honored.

a The revised competitive pricing analysis enclosed replaces old chart on pages 126-127 of the 1991 Sales Reference Manual.

b A complete listing of spiffs for the entire ModuLINE family is located in chapter 17 of the 1991 Sales Reference Manual. Spiffs apply year round and are adjusted accordingly during sales.

c Representative in the Western region reporting tremendous success with upper back accessories. Complete product and price lists are on pages 109-115.

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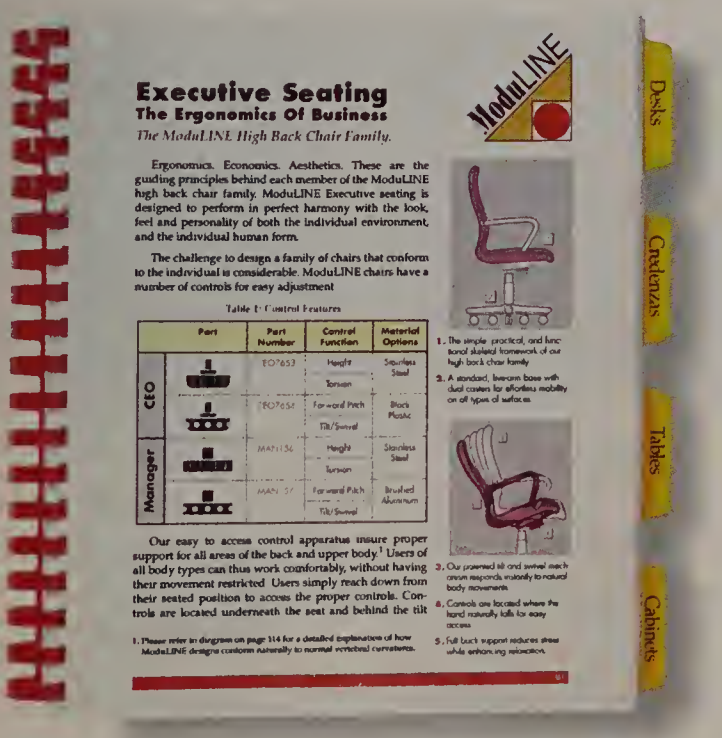

Executive Seating
The Ergonomics Of Business
The ModuLINE High Back Chair Family.

Ergonomics. Economics. Aesthetics. These are the guiding principles behind each member of the ModuLINE high back chair family. ModuLINE Executive seating is designed to perform in perfect harmony with the look, feel and personality of both the individual environment, and the individual human form.

The challenge to design a family of chairs that conform to the individual is considerable. ModuLINE chairs have a number of controls for easy adjustment.

Table 1: Control Features

	Part	Part Number	Control Function	Material Options
CEO		EO7653	Height / Torsion	Stainless Steel
CEO		EO7654	Forward Pitch / Tilt/Swivel	Black Plastic
Manager		MAN136	Height / Torsion	Stainless Steel
Manager		MAN 5?	Forward Pitch / Tilt/Swivel	Brushed Aluminum

Our easy to access control apparatus insure proper support for all areas of the back and upper body.[1] Users of all body types can thus work comfortably, without having their movement restricted. Users simply reach down from their seated position to access the proper controls. Controls are located underneath the seat and behind the tilt

1. Please refer to diagram on page 114 for a detailed explanation of how ModuLINE designs conform naturally to normal vertebral curvatures.

1. The simple, practical, and functional skeletal framework of our high back chair family
2. A standard, five-arm base with dual casters for effortless mobility on all types of surfaces
3. Our powered tilt and swivel mechanism responds instantly to natural body movements
4. Controls are located where the hand naturally falls for easy access
5. Full back support reduces stress while enhancing relaxation.

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MacBulletin

QMS Admits Problems with PS 410 and PS 815

QMS recently confirmed that some units of its popular QMS-PS 410 and QMS-PS 815 laser printers can unexpectedly drop off the network when used over AppleTalk. QMS said that it has eliminated the AppleTalk problem on currently shipping units and that users of an older PS 410 or PS 815 with the problem can request a corrected ROM from QMS technical support. The older units, unlike other Adobe PostScript printers, cannot print TrueType fonts, but that has also been corrected in shipping models and QMS is working on getting a ROM fix to customers, according to the company. In addition, the printers print some characters slightly differently because their controller uses the ATM font-scaler for better speed and improved quality, QMS said. A QMS representative characterized the difficulties as the result of adding new features to the printers' controller. QMS and Adobe representatives denied reports that the printers did not contain true Adobe PostScript. If you are experiencing these problems, contact QMS technical support at 205/633-4500.

Apple Repairing Defective CD ROM Drives

Dust accumulating on the laser's lens can interfere with older AppleCD SC drives' ability to read CD ROMs. Apple will repair drives exhibiting read problems if those drives were manufactured before December 1989 and have serial numbers beginning with F7, F8, or F9. The company is also reimbursing owners who paid to repair out-of-warranty drives. For more information, contact your dealer or write AppleCD Repair Extension Program, P.O. Box 78901, New Augusta, Indiana 46278.

Glitches in NEC CDR-72 CD ROM Drives

Some units of NEC's CDR-72 CD ROM drive have problems that can cause the Mac to crash when transferring files or programs that are larger than 250K to a hard drive, the company recently confirmed. The problems affect some, but not all, drives with serial numbers that begin with 0009 through 00Z, according to NEC. For more information, contact NEC CD ROM technical support at 800/632-4636.

The Long Arm of the LAN

MacVonk USA plans to publish NetOctopus, a network-management tool that permits a network administrator to copy and delete files on other people's Macs. The administrator can perform such routine tasks as synchronizing all the Mac's clocks and installing current printer drivers. NetOctopus can gather a wide range of information about how Macs are configured—for example, it can report on the kind of monitor, number and kind of SCSI devices, and System Folder contents—and present the information in tables that can be sorted by user, by data type, and so on. NetOctopus's control-panel interface gives network users control over the administrator's privileges, and it does not permit the administrator to read the contents of files. NetOctopus lists for $645 for the manager software and ten client installations; additional clients are $275 for five. MacVonk is at 215/660-0606.

The Future of Ashton-Tate

As of late August Borland International's acquisition of Ashton-Tate had not been finalized, but the deal appears likely to go through. Ashton-Tate says it is upgrading its word processor FullWrite and spreadsheet Full Impact to run under System 7, but sources inside the company are pessimistic and expect Borland to kill the products. Borland would not comment about FullWrite and Full Impact but says it will probably maintain dBase on all platforms, including the Mac.

Troubled Ehman Seeks Partner

Macintosh peripheral manufacturer Ehman reports that it is working to overcome a recent cash-flow problem. A lost line of credit coupled with an inventory problem contributed to backlogs in shipping new products, while management problems delayed warranty repair, according to sources at the company. By publication time, the repair backlog should be resolved, company president Michael Ehman says. He also says that negotiations are under way with another manufacturer to help Ehman ease the backlog in orders for its products. For more information, contact Ehman at 307/789-3830 or 800/257-1666.

Adobe Type 1 Back on Macs

Apple has announced plans to release an upgrade to System 7 that will support both Apple's own TrueType font format and Adobe's industry-standard Type 1 format. The upgrade will allow Macs to display Type 1 fonts on screen and print them without

(continues)

Adobe Type Manager (ATM). Until the upgrade is ready, Apple plans to distribute a version of ATM. Apple intends to continue developing TrueType-based products.

For Armchair Geographers

MacGlobe, from PC Globe, combines world and regional maps with a lot of information that can be displayed on maps and studied. For example, you can bring up a map of Southeast Asia and color each country according to population density or how much rice it produces. MacGlobe provides maps of elevation and natural features as well as political maps. It can display information in bar charts, show the location of 1612 major cities, and display countries' flags and play their national anthems. MacGlobe's database cannot be altered. MacGlobe lists for $79.95. PC Globe is at 602/730-9000.

New Life for Old ROMs

Apple is responding to recent criticism (see *MacBulletin,* August 1991) that 32-bit dirty ROMs in the Mac II, IIx, IIcx, and SE/30 do not support System 7's large amounts of physical and virtual memory. Apple plans to develop a software patch for the ROMs; meanwhile, it is distributing Connectix's ROM patch, Mode32, at no charge. People who purchased Mode32 before September 5 can get a refund from Apple by calling 800/776-2333 before December 31.

Jasmine's Hard Times

At press time, Jasmine Technologies was not accepting product orders or allowing customers to return products for repairs. The company is down to seven employees and faces a $6 million lawsuit from a former landlord. "We don't have the money to fight it or settle it," said Jasmine official Nathan Schulhof. More information about the company's uncertain future was expected in late September.

Apple's Mainframe Connection

Apple is now shipping a series of NuBus board gateways into IBM's Systems Network Architecture (SNA), which supports networking among machines running OS/2, VM, OS/400, and MVS. The SNA•ps gateways provide both control unit terminal and distributed function terminal 3270 emulation with advanced peer-to-peer networking and advanced program-to-program communications support. Pricing depends on the number of sessions supported. Apple also has programming tools for creating custom SNA network applications.

New Memories

Active Memory is a desk accessory that combines a multiuser to-do list with a message system. Instead of displaying a calendar, Active Memory displays events in a spreadsheetlike list with eight columns for events, dates, and other information. Although the program lets you send events—such as reminders—to other Active Memory users on the network, it does not store messages for later delivery to a user whose Mac is turned off. Users can define categories for each column and search for items by the contents of several columns at a time. Active Memory requires an INIT to watch the Mac's clock, and like all INIT-based calendars Active Memory noticeably slows the Mac's performance. Version 2.0 lists for $199 for one user, $499 for five users, and $899 for ten users. For more information, call ASD Software at 714/624-2594.

Seiko Unveils Fast Color Printer

Seiko Instruments USA has introduced the ColorPoint PSX, a thermal-transfer printer that is designed to process one image while printing another. This 300-dots-per-inch printer has a high-speed RISC processor, releases the Macintosh quickly, and accepts input from multiple sources simultaneously, according to Seiko. The ColorPoint PSX list price is $9499 for the Model 4, which produces A-size output, and $12,999 for the Model 14, which prints on tabloid-size paper. For more information, contact Seiko Instruments USA at 408/922-5800.

Paper Power

Blueridge Technologies, which sells Unix-based turnkey document storage and retrieval systems, recently shipped a Mac software-only package, called Optix, with such advanced capabilities as rotating or unskewing improperly scanned files, comparing images, and preventing alteration of archived files. The new version of Optix, 3.0, adds support for sharing archives on AppleShare; is able to scan and archive only the contents of boxes containing information instead of an entire form; and can query an archive's index like a database and export the result. Optix 3.0 will list for $695. Blueridge Technologies is at 703/675-3015.

DataViz's New Dialects

DataViz's file-translation utilities, MacLinkPlus/PC and MacLinkPlus/Translators, are being upgraded to version 6.0. The new products incorporate more than 100 new translators, including Ami Pro, FrameMaker's MIF format, and AppleWorks' word processor and spreadsheet formats. MacLinkPlus/PC includes a Mac-to-PC cable and lists for $199; MacLinkPlus/Translators lists for $169. DataViz is at 203/268-0030.

SuperMac Sells Off Software

SuperMac has closed down its software division. Adobe bought the uncompleted ReelTime digital video-editing software. Dantz Development, which developed SuperMac's back-up utilities DiskFit and Network DiskFit, will market a replacement called DiskFit Professional. SuperMac says it will support PixelPaint while searching for a buyer. SuperMac is at 408/245-2202. Dantz is at 510/849-0293. ◻

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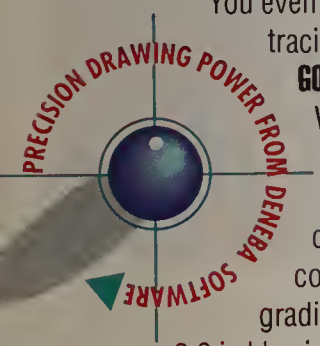

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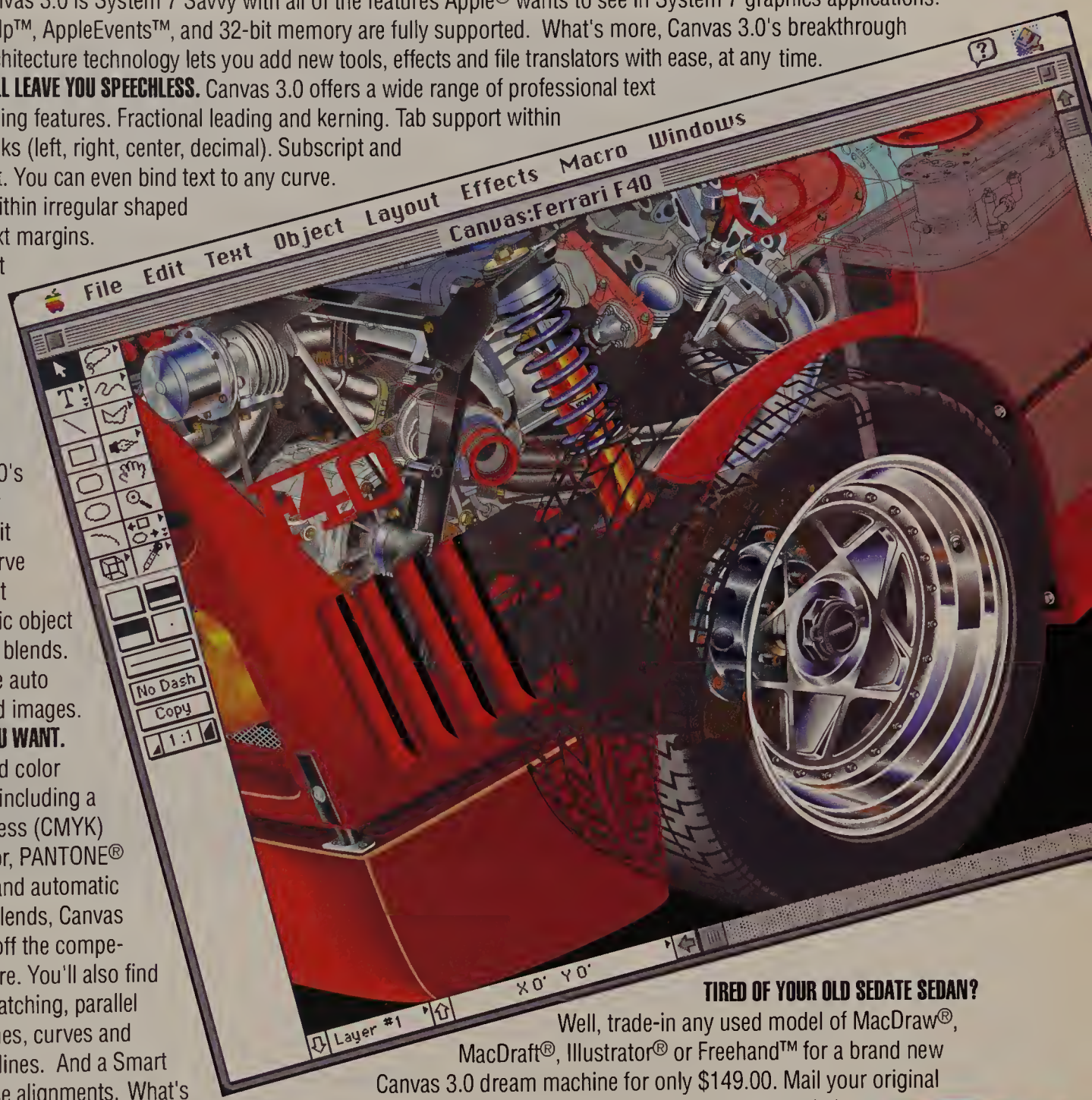

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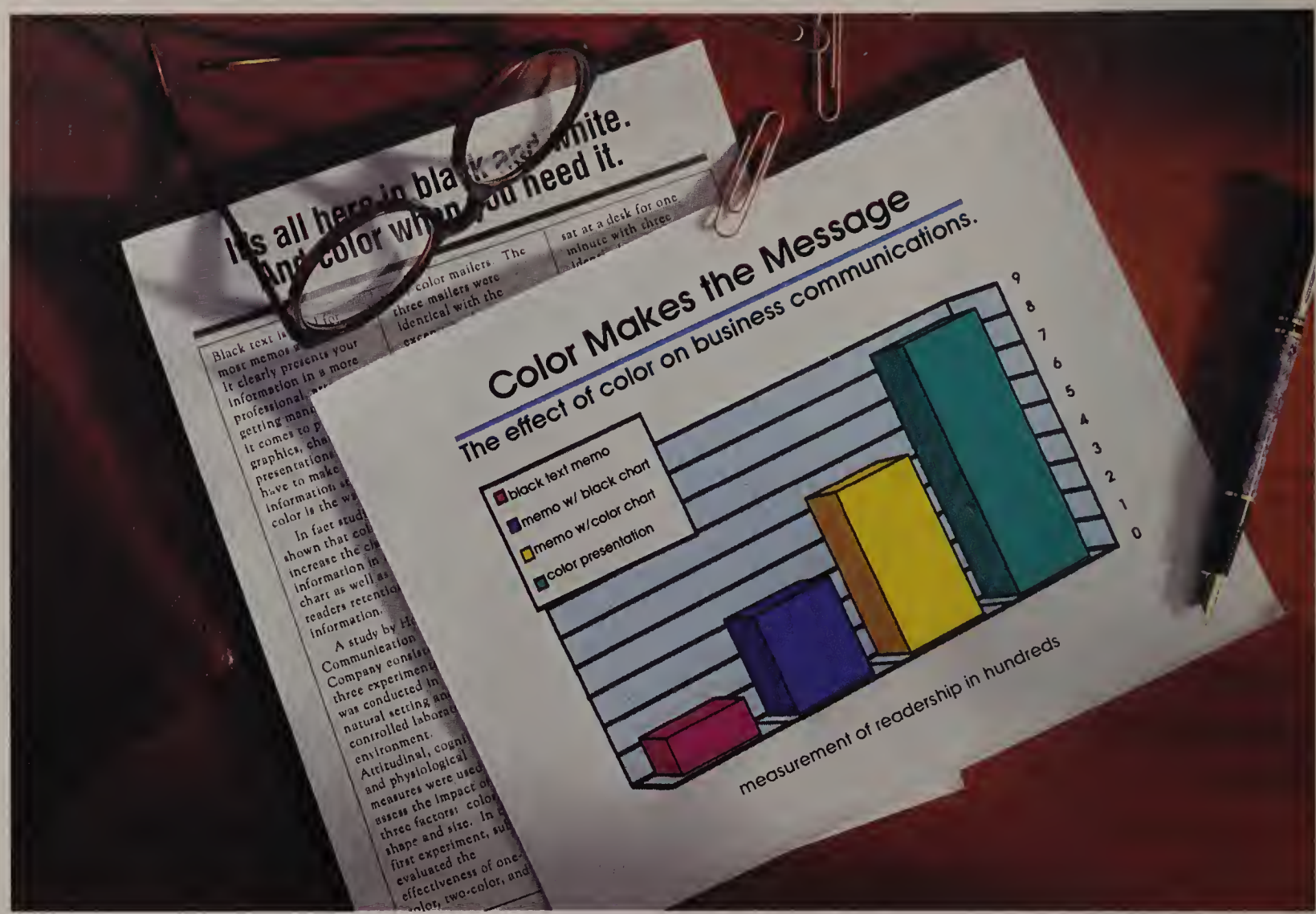
What's the business world coming to?



Now, more Macintosh users can get their hands on some color. Without giving up great black and white. Hewlett-Packard makes it all possible with the new HP DeskWriter C printer. Impressive black and white. And thousands of colors. For just $1,095.*

The best features of HP's DeskWriter haven't changed. You'll still get the crisp, clean, laser-sharp output. The 300 dot-per-inch resolution. And you'll still have all the built-in, scalable fonts and graphic capabilities that can make such a difference in your documents and presentations.

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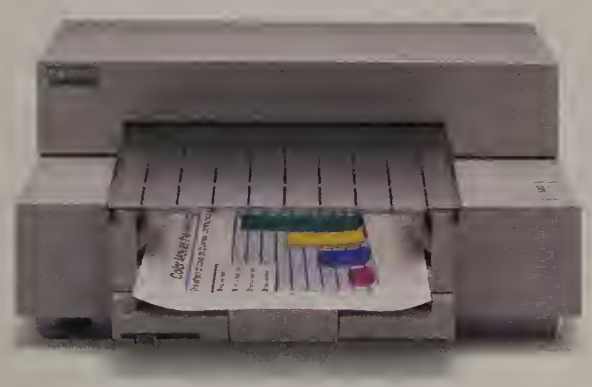

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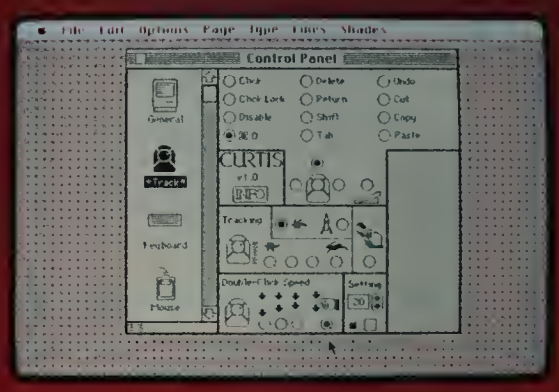

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Sixth Annual Baedeker for Macworld Expo

ON THE TRAIL OF NEW AND SHIPPING PRODUCTS

BY JERRY BORRELL

The August Macworld Expo was in many ways a celebration of QuickTime. For those with patience and insight, the Boston show heralded hardware and software that will bring video to millions of Macintosh computers this fall, after Apple delivers QuickTime extensions to system software. In some ways Apple's announcement of QuickTime has slowed the growth of video technology on the Mac, because developers have been forced to rethink products well into development. But there are few complaints to be heard about such problems. Developers recognize that Apple, by providing underlying technology (compression, sound, and connection to system operations) and a standard (file formats, primarily), has created a near-term QuickTime market of more than two million Mac owners, which will be several million by 1992. Despite the alpha nature of QuickTime, implementations were shown everywhere on the show floor. It was remarkable to see presentations that incorporated real-time demos of QuickTime, and more remarkable to think that Apple has leapfrogged competitors in one fell swoop. It won't be long before the implications and immediate impact of QuickTime cause other companies—including Microsoft and IBM—to realize that they are at a serious disadvantage.

Video

QuickTime raises the question of how we'll get video into the Mac. SuperMac Technology has announced a new product line called the VideoSpigot—video boards that begin at $499 retail (about $350 for you and me) that will allow users to directly connect any camcorder to the Mac for QuickTime movies. It's at an incredibly low price point compared to offerings from E-Machines and RasterOps, whose current QuickTime products already allow us to make QuickTime movies. SuperMac intends to include simple recording and editing software for the VideoSpigot at no extra cost.

Other QuickTime editing software will be forthcoming from DiVA, ComputerVideo, Light Source, and MacroMind. Simple-to-use yet remarkably robust software that will bring professional editing functions (overlays, cuts, insertions, time-encoding) to the Macintosh at low cost. Just as products such as Photoshop are replacing more expensive prepress products, so too video products costing over $10,000 from Ampex, Chyron, and Quantel will be supplanted by Macintosh software costing under $1000—but not for a year or so.

Even the most sacred and inaccessible black-magic area of video—special effects—will be addressed. Intelligent Resources is finally shipping its Video Explorer, which will allow the

Mac to create professional-quality special effects. Computer Friends and Mass Microsystems have boards that allow the Mac to output video signals (synchronized and genlocked) acceptable for broadcast use, and RasterOps announced the addition of CD-quality sound input/output to its 364 boards.

Getting away from video and into computer displays, the benchmark price of $3000 for a 19-inch monitor with 24-bit color is becoming more common; 19-inch monitors with 8-bit boards are as low as $1000 (Relax Technology's NuBus board plus an Ikegami monitor). At the Expo, one 8-bit board for the SE/30 from Howard and Associates was promoted for $195 (monitor is separate). Product quality does vary compared with top-of-the-line monitors and the accelerated video boards many users want, but the rock-bottom pricing of the IBM PC market has definitely arrived on the Mac side. Also evident was a vari-

(continues)

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3-D Graphics

The big bottleneck in this arena is the bovine performance of the Macintosh in rendering 3-D geometry and shading such images. Sadly, the addition of a 68040 accelerator improves performance by only a small percentage. The Mac's architecture and aging QuickDraw graphics routines are going to subject Apple to embarrassing comparisons with vendors such as Silicon Graphics and Compaq. (Apple's dismissal of its advanced graphics hardware group in the summer layoffs bodes ill for any quick fix for this alarming situation.) Despite this, Boston saw the release of several long-awaited 3-D products, including Byte by Byte's Sculpt 4D and AT&T's Topas for the Mac. Topas and Sculpt 4D, at $7495 and $3500, respectively, seem out of reach for most, but they bring the highest-quality modeling, rendering, and animation to the Mac. Ray Dream's remarkable Ray Dream Designer makes high-quality ray-traced graphics practical on the Mac by allowing separate CPUs on a network to share processing tasks. There were also important new versions of other programs shown by Infini-D, Electric Image, StrataVision, and Specular International. Alias Research International, a company known for its software on high-performance workstations, has promised to bring its software to the Mac with Alias Sketch, while Pixar announced Showplace, which is intended to make RenderMan's rendering capabilities more accessible to Mac users.

Integrated Products

This product category (word processor plus database, spreadsheet, and so on) is like the weather: everyone talks about it, but nobody seems to be able to do anything about it. RagTime and Trapeze are two erstwhile competitors that failed in their efforts to topple Microsoft's domination of the integrated-product category. In Boston, Claris demonstrated its to-be-shipped ClarisWorks. Symantec demonstrated its to-be-shipped GreatWorks. Ditto Beagle Bros. with BeagleWorks. WordPerfect announced that it's shipping WordPerfect Office—with mail, calendar, database, word processing, and form maker. It's looking good. Stay tuned.

Printers

Of all peripheral products for the Macintosh, only color printers rival storage technology in the speed of change. All aspects of color printers—size, cost, speed, and quality—are continually improving.

In the thermal-printer arena, Seiko Instruments USA introduced a new RISC-based PostScript clone. The

(continues)

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ColorPoint PSX ($9499 for A size; $12,999 for B size) promises to nip through network color-printing bottlenecks. I'd need to test it before recommending it, but the ColorPoint PSX appeared impressively fast. Hewlett-Packard showed a new color printer, the DeskWriterC (see *Macworld News,* October 1991). There was a host of A- and B-size QuickDraw printers. Calcomp's ColorMaster Plus ranges in price from $6995 to $11,995. Prime Option's ColorPage does A and A3 size at $5000. QMS listened to its customers and added full-bleed capability to its model 30 si (a real boon to graphic artists and designers) and produced a new kanji version of its ColorScript 100.

A printer using color-dye-sublimation technology, the highest-quality (and most expensive) QuickDraw output technology, cost nearly $40,000 only two years ago. At the Expo, Mitsubishi Electronics America showed its S340 printer for only $13,995. The output quality is comparable to that of the original Kodak printer; again, I would like to test the product, but the output quality and cost decrease are truly notable. Prime Option showed another new Japanese dye-sublimation–based product, but it has no price or ship date. Shinko showed a dye-sublimation printer for $18,000, with a PostScript version at $23,500. Finally, Seiko announced a new sublimation-technology–based product. The quality of dye-sublimation technology is remarkable, but in truth I believe most of us want color and PostScript at reasonable quality (200 to 300 dpi) and as cheap as we can get it. Today the best price-quality trade-off comes from thermal printers. Sharp Electronics' new JX-730 ink-jet printer (B size, non-PostScript) for only $2195 is appealing, but I'd still choose a thermal printer.

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Laser Printers

Not to be forgotten are black-and-white laser printers, constantly renewing their hold on our hearts and businesses. GCC Technologies, the oldest innovator in the market, is shipping its BLP Elite. The 300-dpi PostScript laser printer has a list price of $1599 and probably sells for $1399. At 4 pages per minute the BLP is a little slow, but given the price, I wouldn't ever consider a clunker like Apple's QuickDraw StyleWriter—I'd choose the BLP every time. And this is only the start. This fall, prices for nonlaser PostScript printers will be under $1000. Eastman Kodak and QMS showed high-end PostScript office printers (16 ppm) with simultaneous/multiple input (serial, AppleTalk, and Ethernet). Kodak's EKta plus 7016 doubles as a copier and costs only $5795—truly remarkable. Texas Instruments' $2249 RISC-based micro-Laser Turbo is speedy and low-cost.

Color Film Printers

In an interesting tack, film printers (also known as film recorders), 35mm

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particularly, are making a return through analog means because PostScript film printers have continued to be slow and costly (Agfa Compugraphic is the only manufacturer with an installed base). They've never become as popular for the Mac as for the PC environment. Presentation Technologies, the oldest maker of film printers for the Mac market, showed an analog RGB/NTSC input camera for 35mm or Polaroid prints. It looks good, and there's a need, but these days the presentation market has evolved into slide- and display-based segments, making graphic arts the single largest likely target.

Storage and Scanners

Storage (hard drives, optical, CD ROM, and tape) is one of the ongoing successes of personal computing. Thanks to the SCSI interface, Mac owners in particular enjoy ease of use in addition to steady decreases in cost per megabyte and increases in performance. Hardware manufacturers suffer, but you and I constantly benefit. Prices are down to $4 to $6 per megabyte on a hard drive, differing with various size ranges. CD ROM drives have improved dramatically in performance if not price. Chinon America, Optical Access International (OAI), and Relax Technology offer 300ms access drives; Relax and OAI showed an auto-CD changer holding up to six CDs! Several companies, including MicroNet and PLI, are finally shipping 3½-inch magneto-optical (erasable) drives. I love it—now, if only the packaging would shrink.

Color scanners are also experiencing a meteoric rise in quality as prices drop. Two especially neat new scanners: a slide scanner for 35mm slides from RasterOps, called Expresso, for only $999, and a new Kodak 35mm scanner for slides at $8495. My personal favorite is the 1850-dpi, 35mm, 24-bit scanner from Microtek that includes Photoshop for only $2195.

Computer Friends announced a 24-bit $1299 single-sheet-fed scanner; street price should be $999. (We haven't tested it—it would be an incredible bargain if its quality rivaled that of flatbeds, most of which are in the $2000 price range.) New color

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flatbeds include Hewlett-Packard's Scanjet IIc ($1995), Microtek's 600ZS ($2195), Relax's 24-bit scanner ($1299), and Abaton's new 24-bit entry. One scanner oddity that looks useful, if it ships, is Houston Instrument's LDS 4000, which can capture black-and-white scans up to E-size (24-inch-by-36-inch) for $13,995.

Performance

Every one of us running current applications is beginning to talk about how slow the darn things perform. It may be the applications, sure, but it can't be only the applications. So third parties are offering RAM upgrades, accelerators, and enhancements for the Mac to get us sufferers through our long, Mac-bound workdays. (I used to think Newer Technology's 128MB RAM disk had no use—now we have to have it for Photoshop image processing.) Radius's and Fusion Data Systems' 040 accelerators are looking better by the day. FWB's and Atto's $999 and $995 SCSI NuBus boards, respectively, bring current SCSI performance to the Mac. The Connectix suite of utilities—Maxima, Mode 32, Handsoff, and Optima for kanji—are software enhancements that improve the Mac's operating system. And cache boards from a dozen vendors are there to help when the Mac bogs down.

In a related vein, Ethernet add-ons are improving to help with growing network slowdowns. Shiva, Cayman Systems, and Asanté Technologies offered outstanding examples.

Network Tools

My favorite area of esoteric development is that of network tools. Applications that allow network administrators and, at long last, individual users to pinpoint what the heck is going on in all the communications magic we call AppleTalk. It's an encouraging area of development. The Expo had product advances and announcements from AG Group, Pharos Technologies, MacVonk (NetOctopus), CSG Technologies, Caravelle Networks, and a few others. It's fun watching the development of products that allow both network nerds and more-basic users to investigate the problems we're having. M

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Over the past four years I've been associated with over 50,000 people attempting to learn the Macintosh computer. I've watched as each person wages their own personal, private battle to master the computer and the most popular Macintosh programs.

I've seen their frustration, have empathized with their confusion, and understood their computer fears. I've talked to workers who have had new computers and new programs simply dropped on their desk with the directive to, "learn this." I've listened to people who have struggled night after night trying to read and understand a computer manual. Can you imagine trying to understand and master 4th Dimension from the manual?

You would be surprised at the number of people who have confided with me the fact that they've given up trying to learn some of the programs. They put the box on the shelf and write the expenditure off as a bad investment.

Hard Earned Money Wasted

Can you imagine how much money has been wasted on programs and computers that are sitting abandoned? Right now think of the people working on Macs in your office. Do they really understand the computer? Do they know what to do when it goes down? How many programs are each of your people using? Have they really mastered the programs they're using? Do they know the short-cuts and valuable techniques that will save you time, money, and increase your professionalism?

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Four years ago I founded MacAcademy. My purpose was to create a training organization that provided training similar in nature to the Macintosh itself - simple, easy to use, and effective.

Now, four years later the concept has proven to be a great success. Right now people are benefiting from MacAcademy training in over 100 cities in the U.S., in Canada, Great Britain, Australia, Japan, Hong Kong, and 22 additional countries throughout the world.

MacAcademy training is successful for one reason - it works!

The Video Answer

Two years ago we introduced the MacAcademy Video Training Library. This library now includes over 45 different titles. Each video is 2 hours long and offers clear, concise, effective training for the Macintosh and over 20 popular programs. In many cases you can purchase up to 6 hours of training for one program.

MacAcademy has resisted the temptation to follow competitive training programs who have recently implemented large price increases. Our videos started out at $49 each and are still only $49. The best training in the business for less than $50. This low cost training alternative has proven to be the Macintosh training choice of over 10,000 companies.

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- Word 4.0 Part 1 ☐
- Word 4.0 Part 2 ☐

Circle 106 on reader service card

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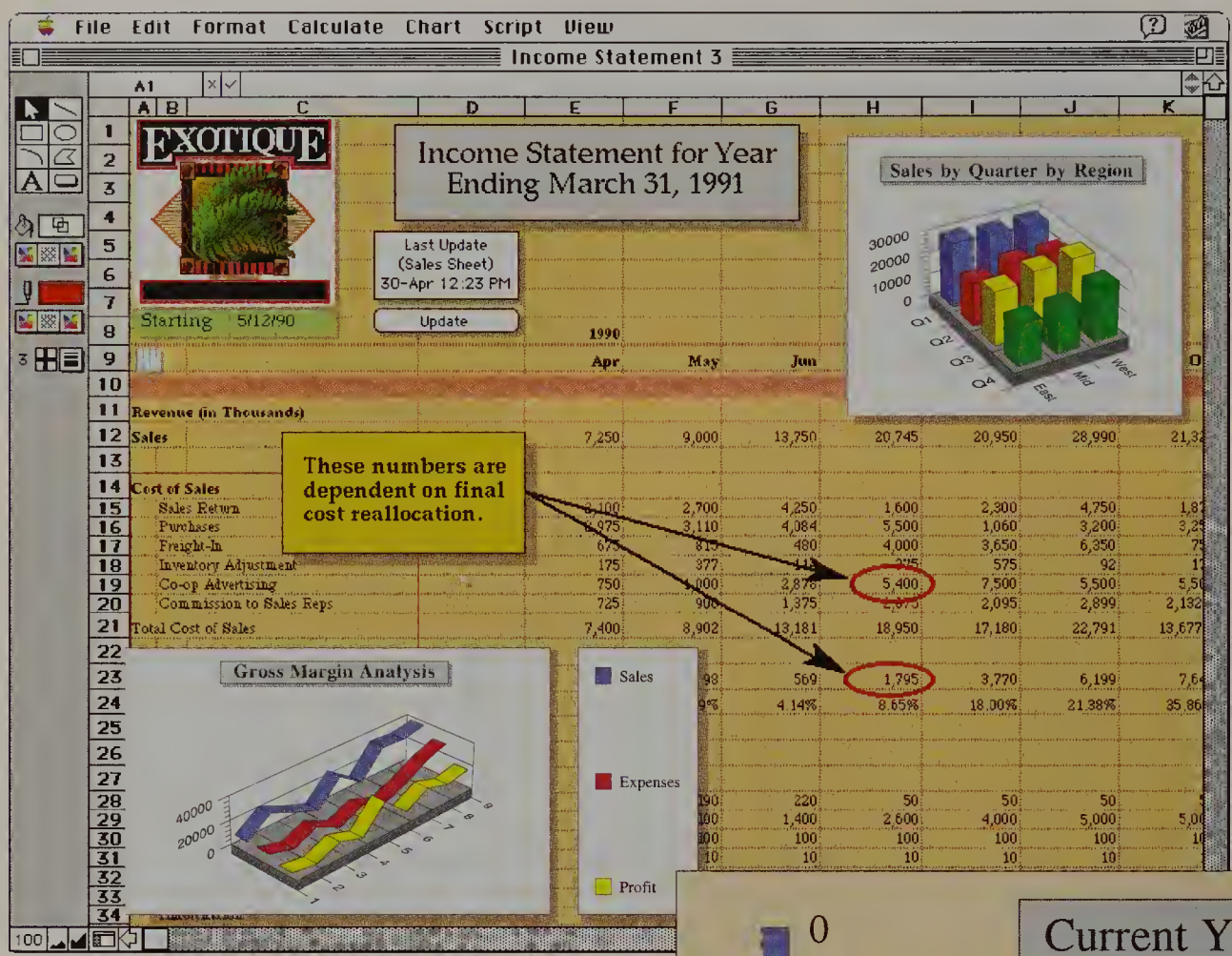
The only thing missing from our new spreadsheet is the learning curve.



Application

- MacWrite II
- FileMaker Pro
- **Claris Resolve**
- MacDraw Pro
- MacProject II
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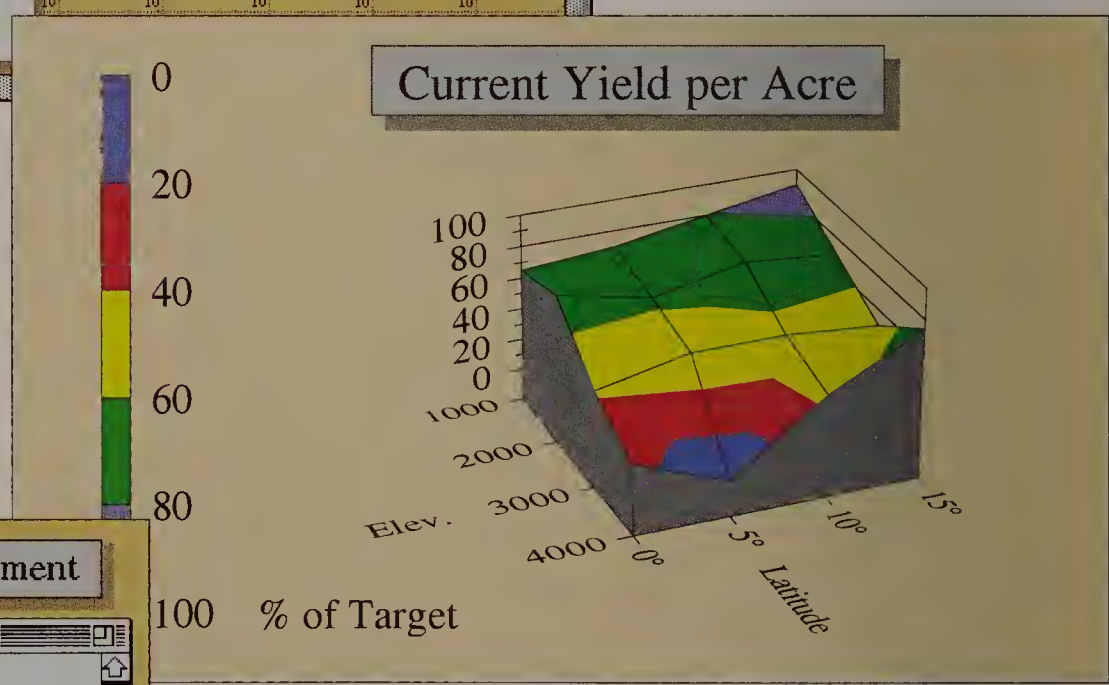
- SmartForm Series
- HyperCard
- MacPaint

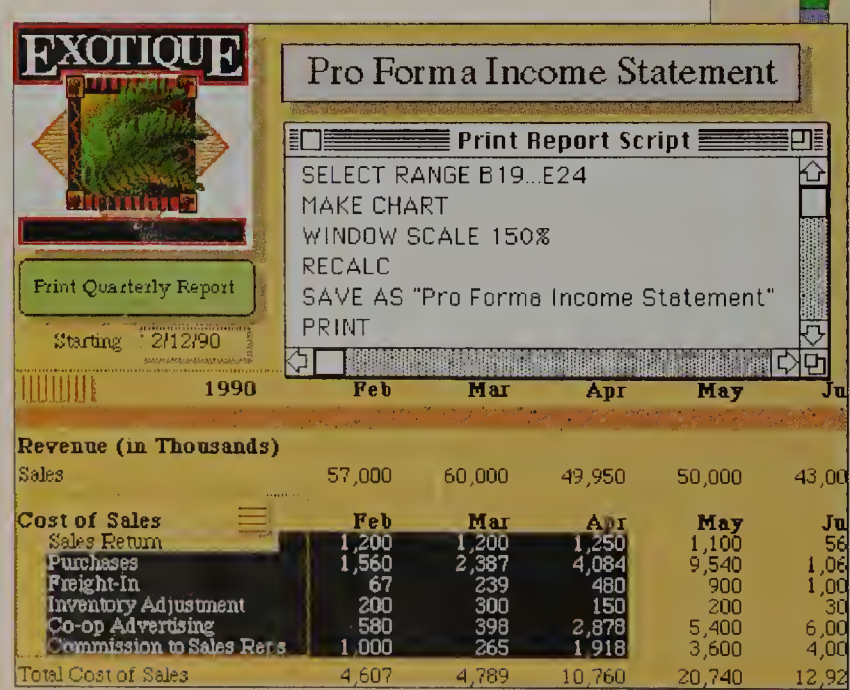
A Family of Applications.

New Resolve joins the Claris family of System 7 software. Software that makes you more productive, because it shares a common interface, tools and commands.

So, You Want It All Now.

With a billion cells and 149 advanced business functions, Resolve is powerful enough to meet your spreadsheet needs now and in the future. Yet its power is readily accessible—for example, zooming, so you can choose to see the forest or the trees.



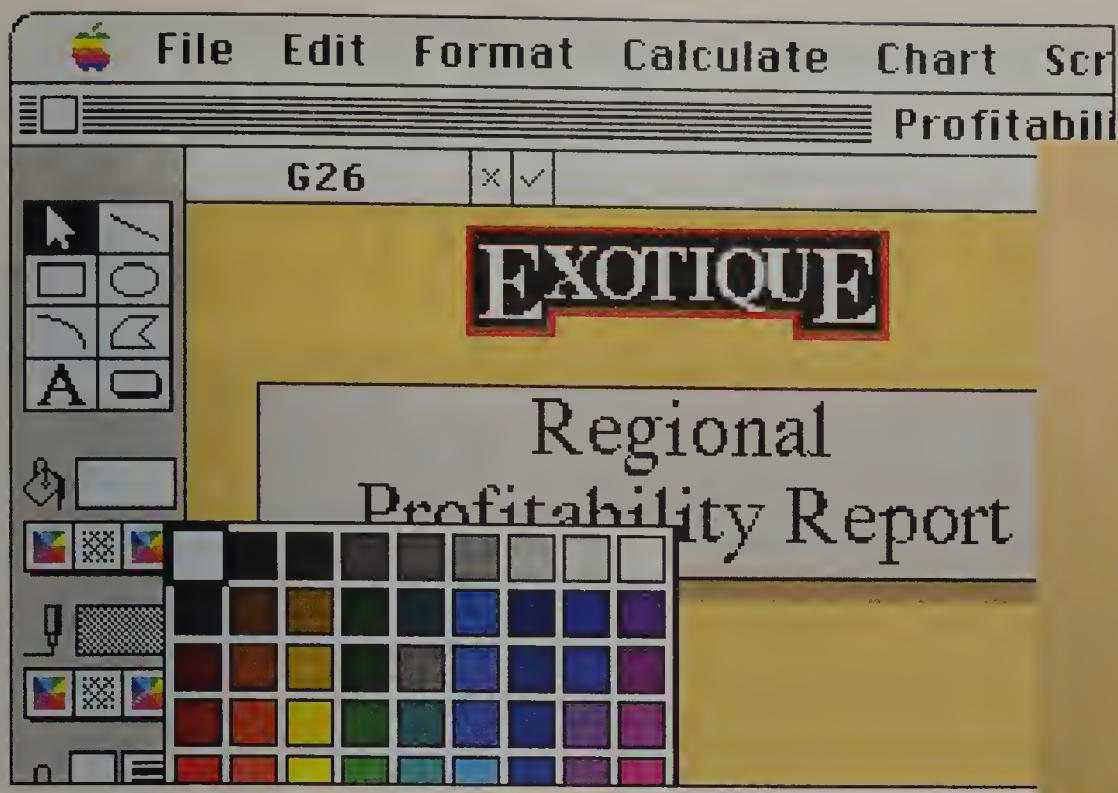


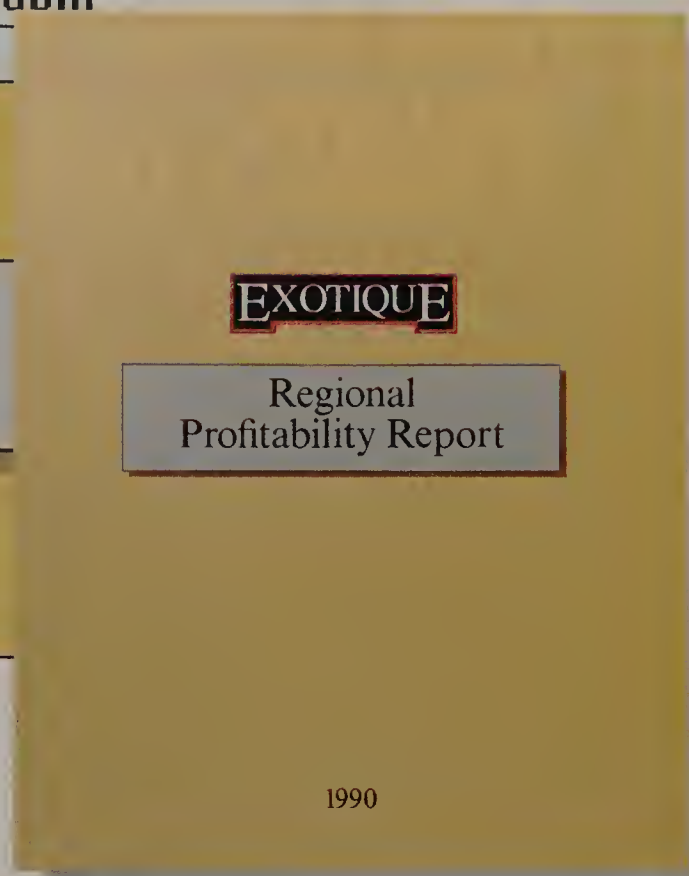
Effortless Graphs.

Making charts and graphs with new Resolve is so easy it makes your head spin. Select your data. Select one of 25 chart types and the results appear before your eyes.

The Ultimate Scripting Tools.

For power users, the Resolve scripting language provides a fully structured development environment, to create ingenious, customized applications. For new users, Resolve automatically writes a script by recording your actions. One click on the assigned button automatically triggers the script.





Finished in a Flash.

Create graphics and handle text with tools you're already comfortable with. Select colors from the 81-color palette. Your important presentations have never been easier to prepare.

The System 7 Spreadsheet

Introducing Claris Resolve.

A spreadsheet was never the sort of thing to inspire fantasies. But then along came the new Claris® Resolve™ spreadsheet.

For the first time, Resolve lets spreadsheet power flow to your fingertips freely and intuitively. It utilizes interfaces, tools and commands familiar to anyone who's ever used a Mac. Nothing comes between you and complete spreadsheet performance.

Resolve is packed with clever, interactive features that help people quickly get their footing. Like context-sensitive help. Automatic scripting. One-step charting. Instant zoom-in and zoom-out. Even a built-in spell checker.

But lurking just beneath the surface are enough tricks to inspire any power user. 149 built-in functions to help solve any business problem. 25 kinds of charts and graphs to excite the most jaded audience. Elegant, built-in database functions so you can swiftly access your data. And advanced analytical solutions to impress the math wizards.

Here's just one example of the outstanding design of Resolve. With Resolve, you can modify graphs directly in your spreadsheet. You don't have to switch back and forth between spreadsheet and chart modes. Think of the time savings. Not to mention the ease.

Yet, perhaps the most shining quality of Resolve is how it exploits System 7's most powerful functionalities – *Publish & Subscribe* and *Inter-Application Communication.* With Resolve, you can put charts in other documents and files and link them dynamically – so when you change any information in the spreadsheet, all the linked charts change as well. What's more, you can create *hybrid solutions,* like creating a HyperCard® program to access a database, send data to Resolve, and create and display a chart. All automatically.

New Resolve is the latest addition to the Claris family of software for System 7 – a new generation of applications that work together more simply, more powerfully, more gracefully than any software for the Macintosh ever has before.

Special offer for owners of other spreadsheets.* Get Claris Resolve for only $99. Call 1-800-544-8554, ext. 98.

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*Offer applies only to owners of Microsoft Excel, Lotus 1-2-3, Informix Wingz, and Ashton-Tate Full Impact. Offer good in U.S.A. only. Expires December 31, 1991.

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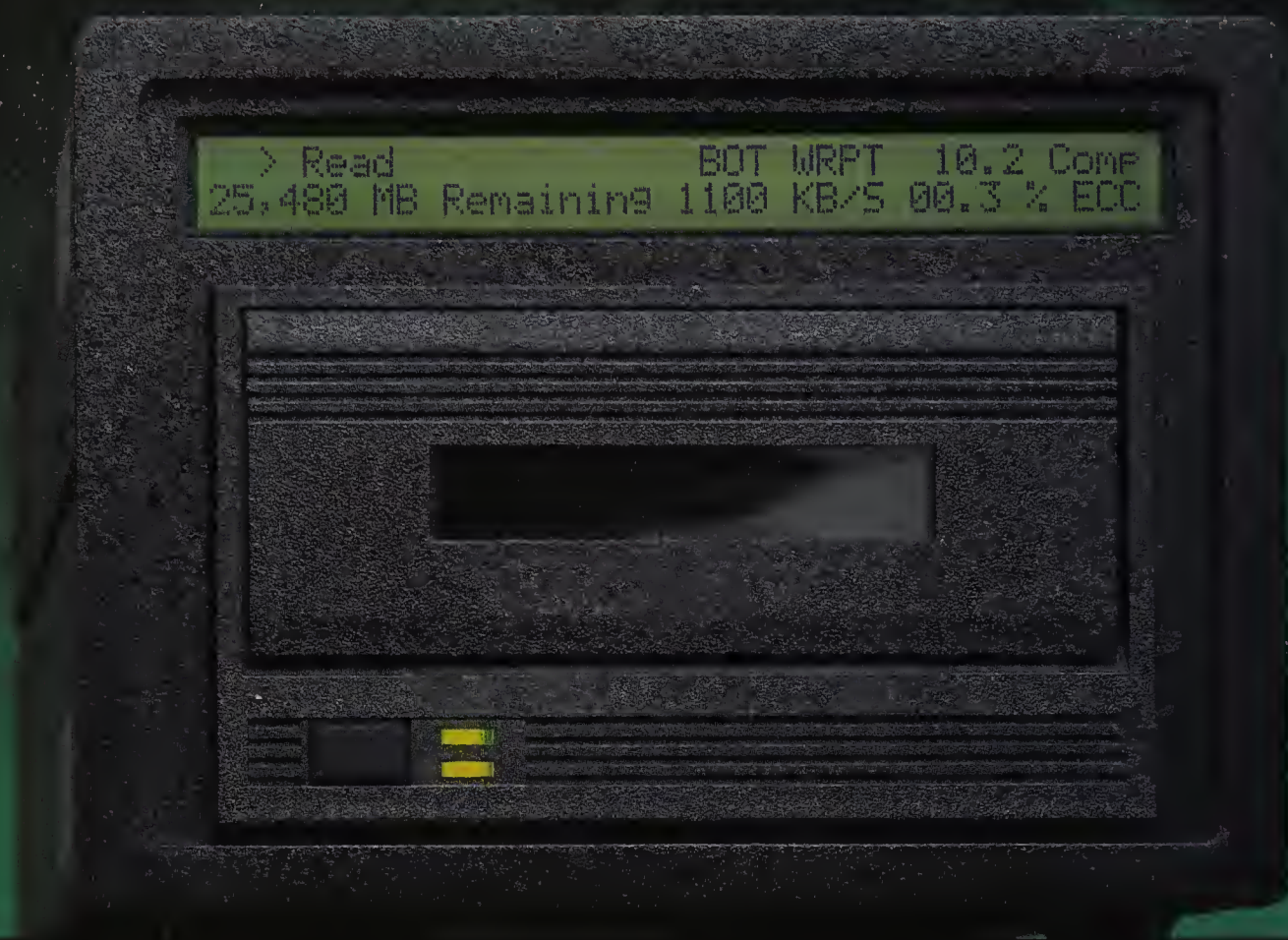

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LETTERS

WARD SCHUMAKER

Fax Modem Playthings

I am amazed at the apparent editorial enthusiasm people are showing for fax modems ["Fax Modem Facts," August 1991]. As useful as they are, they are still toys.

I find the software provided with them unstable. There is no standard fax command set like the data modem AT command set. Consequently, you cannot mix and match software and modems. Fax modems do not connect to real fax machines as reliably as real fax machines do. Fax modems are basically funny QuickDraw printers, not PostScript printers.

Come on, you guys. A little less adoration for this barely adequate gadget is called for. Let's prod the purveyors of these devices into providing a truly useful device.

Glen S. Miranker
via AppleLink

Fax Modem Questions

The article "Fax Modem Facts" says these modems are 9600-bps fax modems and 2400-bps data modems. Why can't the modems send data at 9600 bps? I've also heard there is a difference between baud and bps. Is this true?

Mark Gerrior
Phoenix, Arizona
via CompuServe

Most current fax modems (and all the ones we tested) transmit digital data at 2400 bps, but they send and receive fax data at 9600 bps. The Group III fax-transmission standards provide for the 9600-bps speed, with a fallback speed of 4800 bps in the event of bad telephone-line conditions. Although there is at least one 9600-bps data modem that is also a 9600-bps fax modem, most fax modems are 2400-bps data modems because they are less expensive.

Baud is the rate per second at which a modem sends signals bps (bits per second) is the amount of data that is being transferred. The number of bits transferred per baud sometimes varies.—Ed.

Ambiguous Awards

Looking over your World-Class Awards ["Fifth Annual World-Class Awards," August 1991], I was dismayed to see that in many of the categories, the "Other" manufacturer was several times larger than the winner. Having an "Other" percentage of 86 percent in the Most Promising Newcomer—Software category is ridiculous.

If the categories are so broad or so ambiguous that people cannot come to some kind of consensus, they should be changed so as to reflect some meaningful data. That way, maybe your awards will reflect the views of the majority, not a small plujority.

James Crawford
Watertown, Massachusetts
via CompuServe

A high percentage in the Other category means a greater number of products received a lower percentage of the overall votes.—Ed.

(continues)

Corrections

*The correct phone number for Environmental Systems Research Institute (*Macworld News, *September 1991) is 714/793-2853.*

*RasterOps' hours of technical support are 6 a.m. to 5 p.m. PT. The company's BBS telephone number is 801/221-1129 (*Conspicuous Consumer, *September 1991).*

*The correct telephone number for RasterOps (*Where to Buy, *September 1991) is 800/729-2656.*

*The correct telephone number for Chinon America (*New Products, *September 1991) is 213/533-0274.*

*The correct price for ShiftWorker (*New Products, *September 1991) is $595.*

The trackball shown at the top of the first picture in Conspicuous Consumer *(August 1991) is manufactured by MicroSpeed.*

*The correct telephone numbers for JetFill (*New Products, *August 1991) are 512/479-8400 and 800/749-2993.*

The correct name for Koala Technologies' Video Capture/Effects hardware is MacVision Video Digitizer ("Fifth Annual World-Class Awards," August 1991).

The correct name for Microtek's cowinning col-

(continues)

or scanner hardware is the MSF-300ZS ("Fifth Annual World-Class Awards," August 1991).

The HP PaintJet printer should have been listed along with the HP PaintJet XL printer as cowinner of the Printer—Color hardware category ("Fifth Annual World-Class Awards," August 1991).

Kingsley/ATF's ATF Type Designer 1 ("Desktop Foundry," August 1991) supports Illustrator 1.1 EPSF output format.

*MECC's The Oregon Trail educational game (*Reviews, *October 1991) is not copy-protected.*

Ikon Creative Services ("The Prepress Edge," October 1991) is located in Culver City, California.

*The correct number for the Nanao Flexscan 9060S (*Where to Buy, *August 1991) is 213/325-5202.*

. . . . . .

Popularity Contest

In looking over your top 80, I have to cry foul over a few items. Why are there only 65 items/categories? Second, in the laser printer competition I do not see GCC. Did you only poll people with Apple equipment? GCC has a huge market share; how can it be absent from the list? Third, "Best Authoring Tool—HyperCard." I have been HyperCarded to death. First it was considered a database, then system software, now an authoring tool. Fourth, Microsoft Word won . . . again. C'mon. FullWrite's feature set beats it out, Nisus's text handling knocks it out, and WriteNow's ease blows right past it. Why does Word win? Because 10 gazillion business offices use it.

The results of this survey don't tell me what people think is best . . . it only tells me what people own.

James Lentini
Brooklyn, New York
via America Online

The World-Class Awards recognized 81 products in 65 categories. We surveyed 4000 randomly selected *Macworld* subscribers for the results. The contest reflects readers' preferences.—Ed.

Craving Computer Control

In his column "The New Frontier" [*The Iconoclast,* August 1991], Steven Levy laments the onset of the "Macintosh's boring middle age" based on his impressions of Frontier, Dave Winer's IAC-based scripting application.

Mr. Levy seems to have confused making things easy with making things possible. The development of each of the dramatic ground-breaking applications in personal computer history has resulted in user empowerment, not ease. The coordination of many simultaneous activities is one of the most difficult and complex tasks imaginable. Yet this is precisely the power that Frontier attempts to provide. It is not fair to relegate Frontier to the realm of "wireheads" simply because it demands a learning investment from the user. The ease with which it can be done is less relevant than the fact that

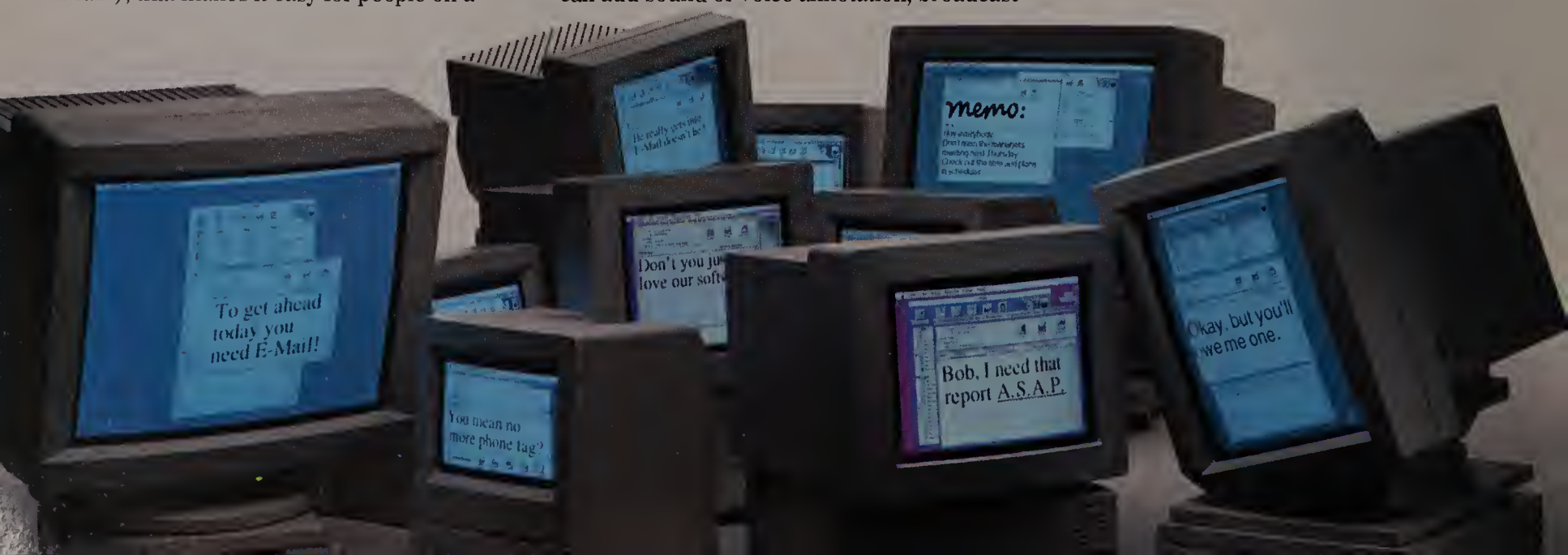
How to be social.

Think how much more effective your people would be if they could communicate better. That's the idea behind WordPerfect Office™ 3.0 for the Macintosh.

It's actually several programs in one. WordPerfect Office comes with a very versatile E-mail package (WordPerfect Office Mail™), that makes it easy for people on a Macintosh network to keep in touch. The mail screen shows you everything you need to compose and circulate messages to an individual, to a group, or to the entire corporation.

With Mail, not only can you send and receive messages, but you can also attach up to 100 files of any format. Beyond that, you can add sound or voice annotation, broadcast a message to anyone logged onto your network, or send carbon and blind copies.

Ever wish you could take back your words? Mail's unique status tracking capabilities let you know when a message has been delivered or opened. So if a message hasn't been read yet, you can retract and edit it.



it can be done at all.
Keith Mears
Richmond, California

Mac Standard in Science

Your article "Science and the Mac" [August 1991] starts out with "The Macintosh, you may be surprised to learn, is the computer of choice in a wide range of advanced scientific laboratories." No, I'm not surprised, although I can see why *Macworld* would be, since the articles in your magazine rarely mention the Mac in anything but desktop publishing.

The "Science and Technology" feature regularly shown on CNN mentions the Mac every week in an exciting application. Recently, *Money* magazine highly recommended the Mac for use in home business. The Mac has truly become the "second standard" in corporate business. Users in these areas are desperate for information on how to advance their productivity.

Consider eliminating some of those arcane articles on DTP and give space to subjects that hold the future of the Mac.
Matthew Conti
Groton, Connecticut

Out-of-Date Developer

There are two ways to view Steven Levy's article on Working Software. [*The Iconoclast,* July 1991]. Little, quality-guy Dave Johnson is dwarfed by the megabucks heartless corporations.

But when every word-oriented product came out with built-in spelling checkers years ago, maybe it should have dawned on someone that the continued success of a stand-alone spelling checker might be limited.
L. R. Olson
Whittier, California

Powerful Protection

The letter on electrical power protection [*Letters,* July 1991] makes broad and unsupported derogatory claims about surge protectors based on metal-oxide varistors (MOVs). I would like to set the record straight.

Properly designed AC surge protectors that use MOVs are long-lived and rugged. For 20mm diameter MOVs, a standard size for serious protectors, manufacturers' ratings indicate a lifetime of more than 500 surges [of the IEEE Ampere test pulse]. To give an idea of what this means to a user, if you had a direct lightning-strike to your building's power feed once per year, in 500 years you would be approaching the manufacturer's MOV life.

We agree that surge protection on AC lines alone isn't enough for computers that are interconnected by wire to other equipment. The best answer to this problem is to use additional signal-line protectors, connected to the ground reference for the AC power, at both ends of the interconnecting cables.
Richard Cohen
Vice President, Engineering
Panamax
San Rafael, California
(continues)

How to get a date.

Of course, open communication is only one of many ways to bring people together. That's why WordPerfect Office 3.0 for the Macintosh also offers an integrated calendar and network scheduler to help you make appointments, coordinate meetings, schedule events and company resources as well as make to-do lists.

Along with WordPerfect Scheduler and Calendar, WordPerfect Office includes other useful desktop utilities such as Notebook, a flat-file database program; File Manager to help you organize your files; and Forms Maker to create custom forms for Mail, Notebook, and Calendar.

Want to know more about WordPerfect Office 3.0 for the Macintosh? That's easy, too. Just call us at (800) 526-2252. It could be the start of a very productive relationship.

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Rendering Redefined

Getting Started with 3-D Graphics" [August 1991] incorrectly defines rendering as the process of choosing and applying surface properties (color, transparency, texture) to a geometric model. Rendering is something quite different.

Once a model, including its surface properties, is built, that model can be automatically rendered (made visible) in a variety of ways. The three most common rendering techniques are: wire-frame rendering (lines describe object edges only); flat-shaded (object surfaces are rendered as solids made of planar facets, each of a single color); and smooth-shaded (the surfaces are shaded to reflect light as if they were rounded, so the facets are not seen). After that, the more esoteric rendering techniques such as ray tracing and radiosity can give highly photo-realistic results.

One of the main benefits of 3-D software went unmentioned: during the design phase, simple rendering techniques can be used, and the time-consuming renderers used only during the final phases of working.

Harold Hedelman
San Francisco, California

Whither the Tested?

What do you guys do with all the computers, disk drives, scanners, software, and so on that you review once you're done testing them?

Paul Kahn
Kew Gardens, New York

We automatically return hardware to the vendor who loaned us the product, and we return software upon request.—Ed.

Mail-Order Suspect

I have received mail-order catalogs that list the games I want at reduced prices. Is there anything wrong with the games because their price is lower? Also, how safe is mail order, and which service do you recommend?

Ben Wagman
Westbury, New York

The same software is sold through mail-order houses as through retail stores. See *Conspicuous Consumer* in this issue for more on mail order.—Ed.

Bottom Line Deal

In response to your July 1991 *Letters* column, I too have used the services of Bottom Line Distribution. As a novice, I asked questions and got helpful, sincere counseling. I've ordered software and gotten the best price and product in hand the next day. It's almost like magic.

If you had to answer my questions, you wouldn't want to do it on your own time, I guarantee you. I think they should be able to charge for product, service, and information.

J. K. Hazel
Bellingham, Washington

Pretentious Mail Order

I was appalled to see that Bottom Line Distribution had a 900 number and a 900 fax to boot. What a bunch of pretentious jerks. The only time I'll mention

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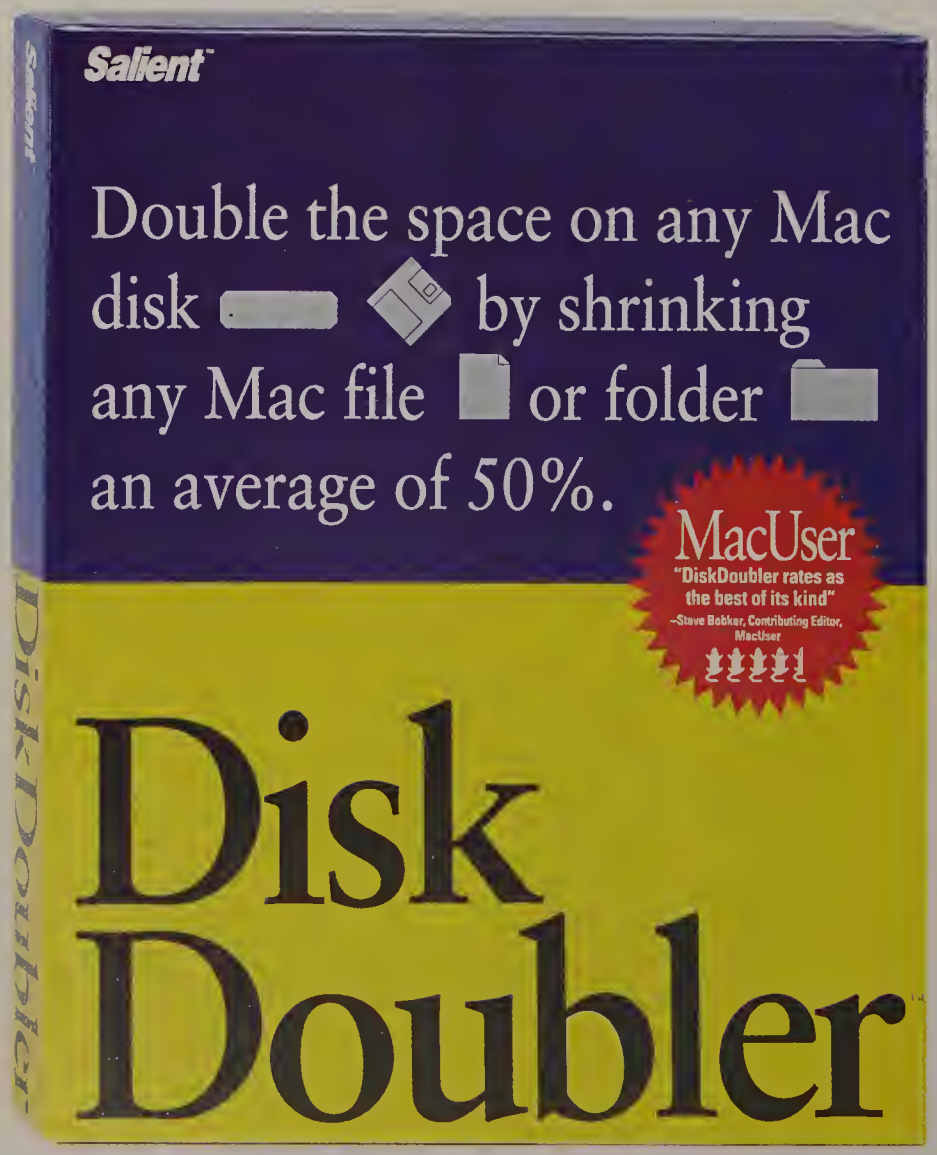

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Introducing the LabelWriter II. The fastest, most versatile desktop label printer ever made.

While the original LabelWriter® ushered in a convenient way to make labels, the LabelWriter II perfects it. It's about five times faster, offers twice the print resolution, and can handle 350-label rolls.

This mighty little printer comes with powerful software that lets you create, format and print a label at any time, without interrupting your main programs. You can also combine text in any font and style with clip art and graphics.

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Compare the original CoStar LabelWriter to the new and improved LabelWriter II.

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For bigger jobs, there's LabelWriter II Plus. Same small size, but with the ability to print on larger 2¼" x 4" and floppy disk labels.

The LabelWriter II and LabelWriter II Plus retail for $249 and $399 respectively; and are compatible with System 6 and 7, Adobe Type Manager™ and TrueType.™ An AppleTalk® option is also available.

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Bottom Line Distribution to my clients is when I'm making a point of where not to order.
Tim Moran
North Hollywood, California

Thumbs Up for 7

I've read letter after letter in Mac-related publications from users who are complaining about System 7–compatibility problems. I manage the advanced technology group for a large financial institution in Pasadena. We have converted all of our machines to System 7. We regularly use and test hundreds of applications. We have experienced two compatibility problems that could not be solved easily. In both cases they were nonessential applications.

If I didn't know better I'd think there was an underground movement of Apple-bashers working with the press to generate bad news about System 7. System 7 works. Once you get used to using it, you'll never go back to System 6.
Marvin Price
La Verne, California

Thumbs Down for 7

System 7 is truly a hideous white elephant, useful only for major corporations. Most of the people upgrading are fools for doing so. I look back fondly on the days when virtually all Mac programs were lean and mean. Now more programs are slow, bloated, memory-hogging, feature-laden blimps.
Bruce Long
Tempe, Arizona

Advertisement Glut

The 63-page MacZone advertisement in the July issue was the last straw. Do you realize that 18.2 percent of that issue was a MacZone ad? Do you know what percentage of *Macworld* is advertising?

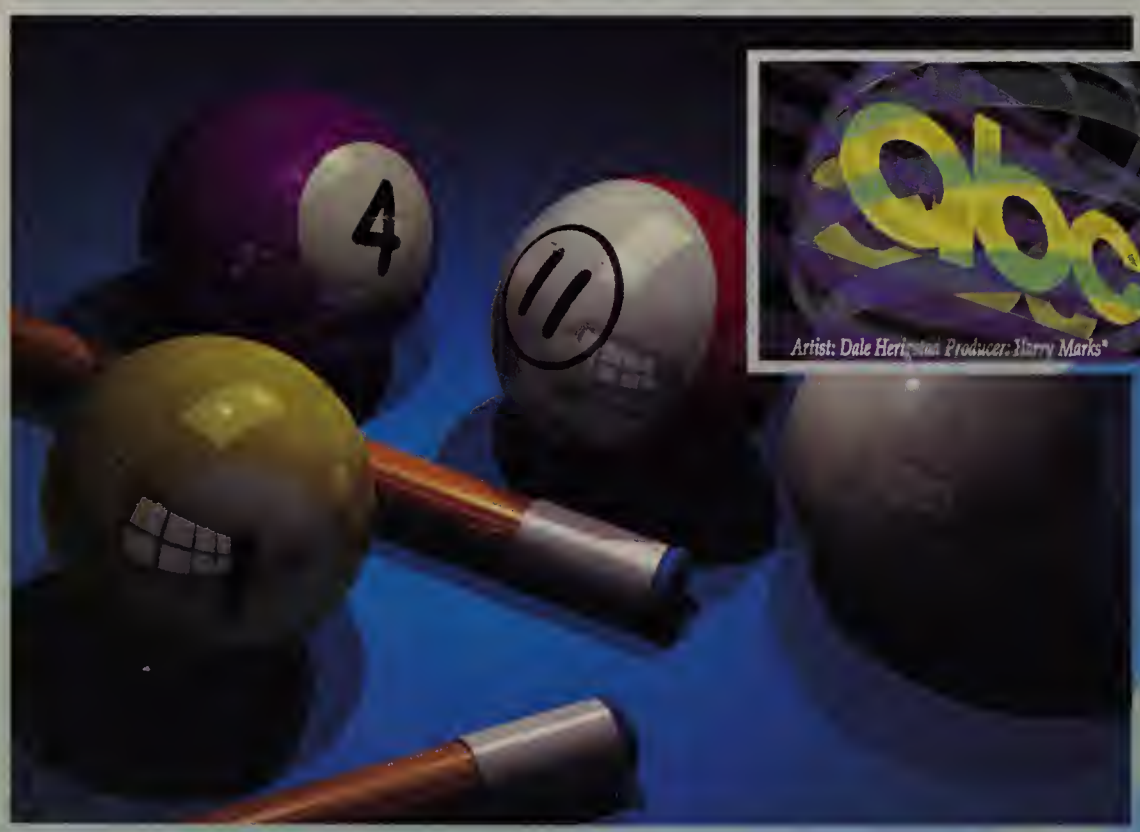
It has become apparent to me, due to the volume of advertising and subsequent lack of text, that you have decided to reap the benefits of the advertising dollar and ignore the advantages of a dedicated and loyal readership.
Lee Spencer
Anchorage, Alaska

800 Support Returns

In response to the letter in your September 1991 issue about Epson's 900 [technical-support] line, we are pleased to say that on July 23 we reinstated our toll-free consumer-support number: 800/922-8911.
Dave Christopherson
Director,
Customer Resource Center
Epson America
Torrance, California

Letters should be mailed to *Letters, Macworld,* 501 Second St., San Francisco, CA 94107, or sent electronically to CompuServe (70370,702), MCI Mail (294-8078), America Online (Macworld), or AppleLink (Macworld1). Include a return address and a daytime telephone number. We regret that, due to the high volume of mail received, we are unable to respond personally to each letter. We reserve the right to edit all letters. All published letters become the property of *Macworld.*

PHOTOREALISM



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Circle 293 on reader service card.

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4½

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ThunderWorks is System 7 compatible. LightningScan 400 runs on all Macs. LightningScan Compact runs on Macintosh Classic, SE/30, SE with SuperDrive, and Portable. LightningScan Pro 256 requires a Macintosh II, LC, or SE/30, four Mb suggested. LightningScan, SnapGuide, ThunderWorks, Thunderware and its logo are registered trademarks of Thunderware, Inc. Macintosh and SuperDrive are trademarks of Apple Computer, Inc. ©1991, Thunderware, Inc. All rights reserved.

Circle 222 on reader service card

Next time you

The original mail order source for Macintosh products. Since 1984. 1991 Macworld World Class Award Nominee for Best Customer Support-Software.

System 7 Video. No doubt you've read a lot about System 7. But what will it do for you? Recently, *Macworld* Contributing Editor Lon Poole—a System 7-savvy kind of guy—visited the production studios of PCTV® and helped us put together a video that makes the power of System 7 perfectly clear. And it's free when you order Apple's System 7 for $99 (1074). Or buy one for just $9 (2244). We also have Lon's book *Macworld Guide to System 7* for $19 (2238).

Products preceded by the symbol ❼ are compatible with **System 7**. For *specific features* of System 7, please ask your salesperson at the time of your order.

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We carry only the very **latest versions** of products. For products or versions not yet released at press time we've indicated the expected availability dates as supplied to us by the manufacturers. Also, all software is not copy-protected, unless indicated otherwise by *(CP)*.

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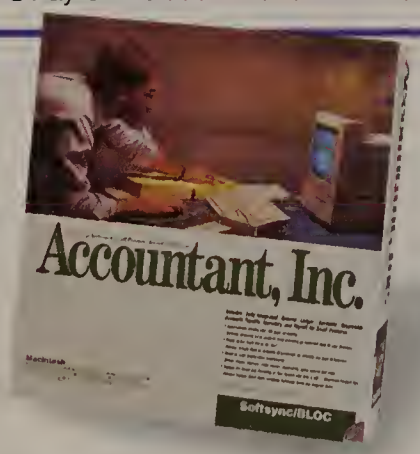

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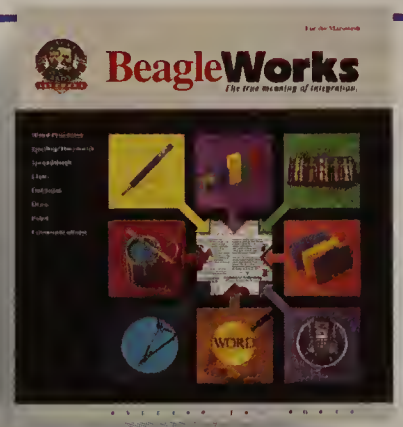
★CheckMark Software ... 60 day MBG
5863 ❼MultiLedger 2.0 . . . . . 235.



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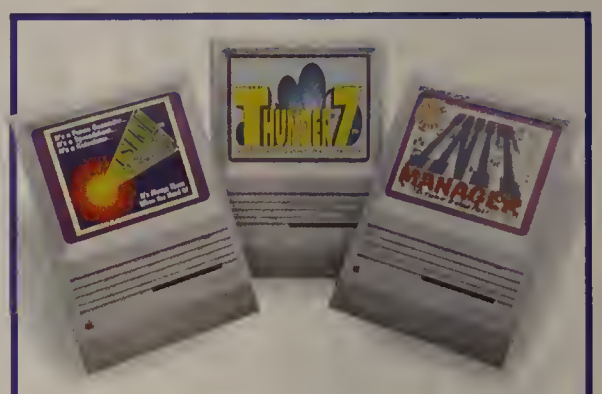

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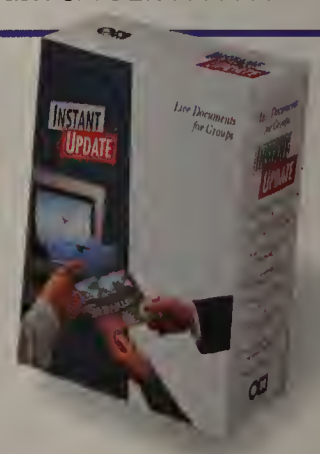

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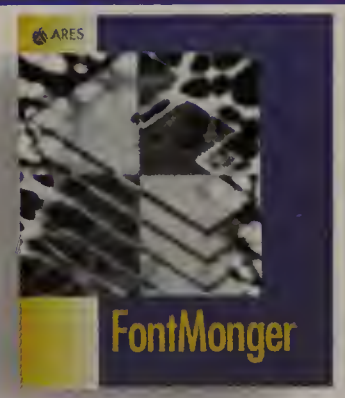

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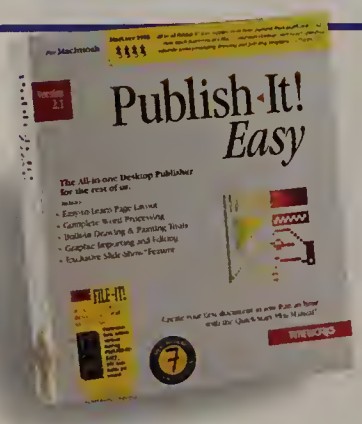

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3114 ❼INIT Info . . . . . 39.
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2198 ❼More After Dark *(M.A.D)* . . . . . 23.
2196 ❼After Dark & M.A.D. Bundle . . . . 42.
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3421 ❼THINK Pascal 4.0 . . . . . 165.
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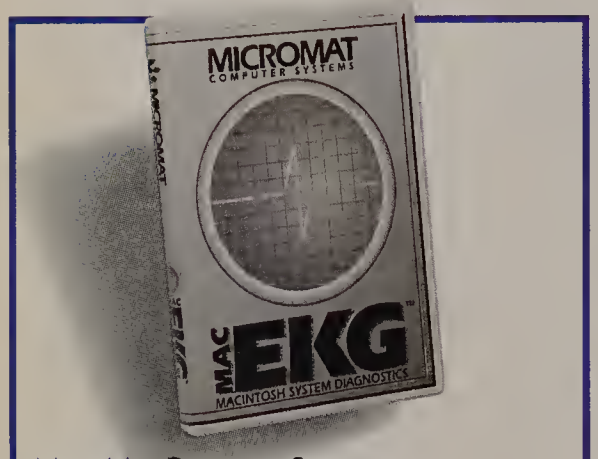

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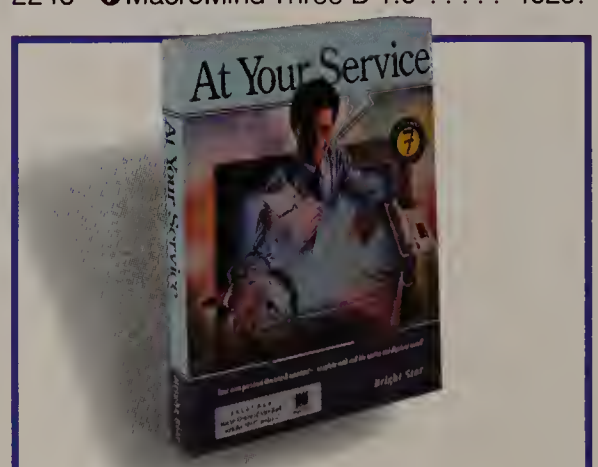
5087 ❼MacroMind Director 3.0 . . . . . 699.
2246 ❼MacroMind Three-D 1.0 . . . . . 1029.



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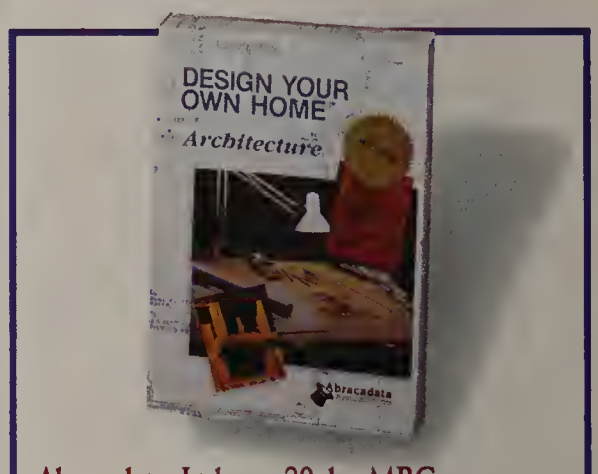
★Symmetry ... 30 day MBG
8172 ❼Mariah 1.0 . . . . . 93.



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8220 ❼Jack Nicklaus Golf . . . . . 34.
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★Baseline Publishing ... 30 day MBG
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❼HyperBible 2.03 *(KJ or NI)* . ea. 125.

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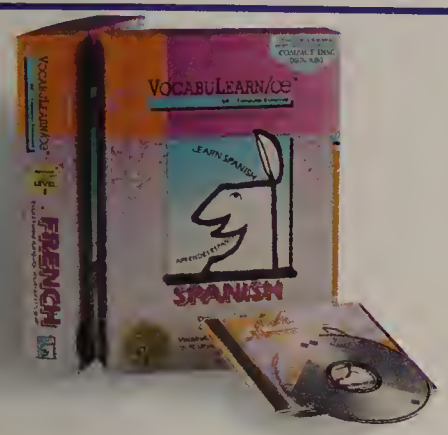

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6516 The Playroom 1.1 *(CP)* . . . . . 29.
Carmen Sandiego Series *(CP)* . .ea. 29.
6384 ❼PlayMaker Football 1.1.1 . . . . . 29.
9804 RoboSport 1.0 . . . . . 35.
8195 ❼BannerMania 1.0 . . . . . 35.
8266 SimEarth 1.0 . . . . . 40.
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5871 SimCity Supreme 1.2C . . . . . 47.
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5726 ❼Voyager 1.2 . . . . . 87.
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1893 ❼CheckMate *(infinite play levels)* . . 31.
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2670 ❼Reader Rabbit 3.0 *(CP) (ages 4-7)* 34.
★Leister Productions ... 30 day MBG
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★Microsoft ... 30 day MBG
2868 Flight Simulator 4.0 *(CP)* . . . . . 43.
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2716 ❼Word Search Deluxe . . . . . 35.
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8229 ❼Bane of the Cosmic Forge . . . . . 35.
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4619 ❼Mavis Beacon Typing 1.3 *(CP)* . . . 32.
1908 ❼World Atlas or 1910 U.S. Atlas ea. 52.
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3464 ❼Tetris 1.3 or 6112 ❼Welltris 1.1 ea. 22.
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3459 ❼Falcon 2.2.1 or 8181 ❼Vette 1.0 ea. 33.
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2685 ❼American Civil War 1 . . . . . 29.
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★Terrace Software ... 30 day MBG
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★Argosy Software ... 30 day MBG
7872 ❼Software Bridge/Mac 2.0.1 . . . . . 99.
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1673 ❼CompuServe Navigator 3.04 . . . . 49.
1674 ❼Membership Kit/Navigator Bundle 68.

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6758 DoveFax Desktop 2.0 *(Sept.'91)* 295.
9634 DoveFax+ 2.0 *(Sept. '91)* . . . . . 359.

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4866 ❼Timbuktu/Remote 2.0.1 . . . . . 135.
9961 PhoneNET Card PC . . . . . 209.
6273 PhoneNET StarConnector 10-Pack. 129.
4869 PhoneNET Connector 10-Pk *(DIN8)* 198.
2206 PhoneNET StarController 300 . . . . 899.
6687 PhoneNET StarController-EN 500 1739.

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6115 ❼White Knight 11 . . . . . 85.

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8946 ❼TelePort A300 . . . . . 139.
8945 ❼TelePort/FAX . . . . . 185.

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2300 ❼Smartcom II 3.2A . . . . . 84.
8614 Personal Modem 2400 Plus . . . . . 149.
7391 ULTRA 96 Modem . . . . . 669.

Insignia Solutions
7557 ❼Access PC 1.1 . . . . . 62.
9726 ❼Entry Level SoftPC 2.5 *(Sept. '91)* 135.
4089 ❼Universal SoftPC 2.5 *(Sept. '91)*. 245.
3229 ❼SoftAT 2.5 *(Sept. '91)* . . . . . 329.

Intel Corporation
5119 2400EX Modem 179. 6420 (MNP) 229.

★Kennect Tech. ... 30 day MBG
5631 ❼Rapport 1.3.6 . . . . . 195.
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8027 MacModem V.32 . . . . . 689.

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8994 2400 V.42 bis Modem . . . . . 209.
7934 PM9600SA Modem 1.26 . . . . . 469.
9849 SmartPack 9600 . . . . . 529.

★Prometheus ... 30 day MBG
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3232 ProModem 24/96 S/R Minifax Plus 269.
8990 ProModem Ultima . . . . . 689.

PSI Integration, Inc.
3143 COMstation 1 . . . . . 285.
3142 COMstation 2 . . . . . 379.

★Shiva ... 30 day MBG
3444 ❼NetSerial . . . . . 275.
4347 NetBridge or 4942 ❼TeleBridge . . 409.

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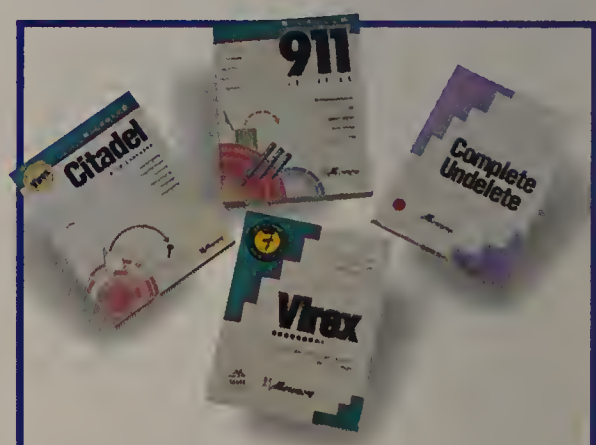

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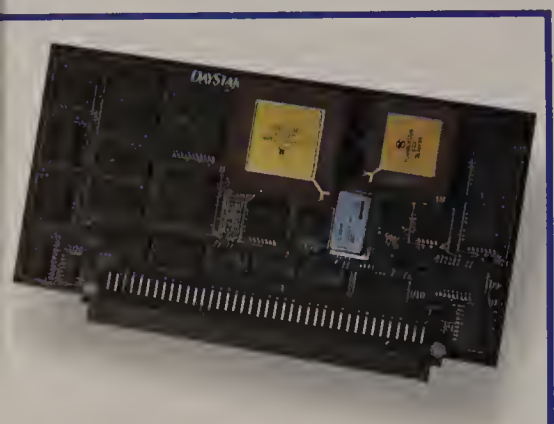

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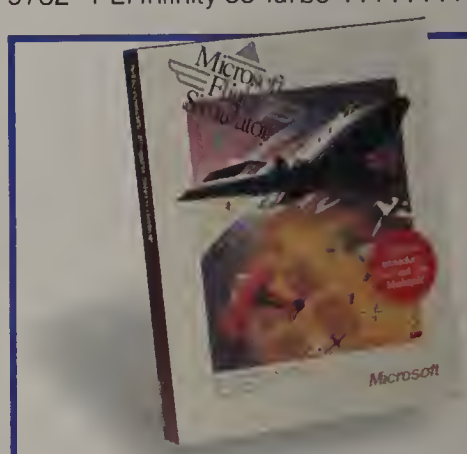

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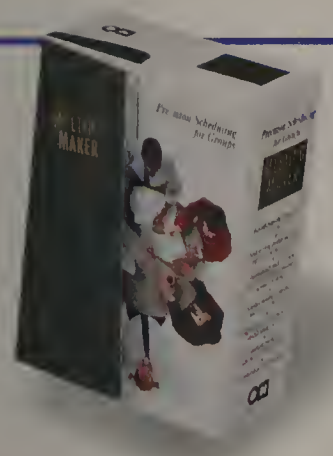

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ART BEAT

by Cathy Abes

The tools and the talent behind Macworld's graphics and the techniques that make them possible

Artist: A graphic designer and 3-D animator who recently left New York City to live in San Francisco, Jim Ludtke began his career as an airbrush artist. When he bought his first Mac—a 512K—at Macy's, he considered it a toy. He slowly began incorporating it into his graphic work and for the past three years has worked entirely on the Mac. He has since thrown away his airbrush.

Hardware: Mac IIx with 8MB of RAM; 50MHz Daystar Digital Accelerator; 300MB MicroNet external hard drive; MicroNet 45MB removable-cartridge drive.

Software: Sculpt 4D; Electric Image; Adobe Illustrator 3.0; Adobe Photoshop 2.0; Sculpt Mover.

How It Was Done: For this month's cover illustration depicting our networking feature, "Building a Better Network," Ludtke began by building the three-dimensional models of the monitors, CPUs, and other objects in Byte by Byte's Sculpt 4D, a process that took about eight hours. After drawing a rectangle with curved edges and extruding it with the grabber tool, he created the back of the monitor by shrinking its cross section while continuing to extrude it. This was done within the Resize dialog box simply by selecting a numeric value for the amount of shrinkage.

The illustration that appears on this month's cover.

Ludtke created the grooves on the monitors and CPUs as 3-D objects—thin black rectangles. After drawing one rectangle, he duplicated it as many times as necessary and placed all the rectangles slightly above the surface of the monitor or CPU. He decided not to create the grooves as texture maps because he found 3-D objects render more sharply than texture maps in Electric Image.

Also done as 3-D objects were the Mac IIci and Apple logos. In Illustrator 3.0 Ludtke selected the Macintosh IIci text, chose Create Outline, and saved the outlines as an Illustrator file with the suffix *.art* (so he could open it in Sculpt Mover—a utility that converts many types of 2-D and 3-D files to other 3-D formats—and import it into Sculpt 4D). Ludtke opened it in Sculpt 4D, filled the outlines so they had a surface made up of numerous polygons, gave them a flat black color, and reduced them to the correct size. Then he positioned the text outlines and the Apple logo (which he drew as an outline in Sculpt) as close as possible to the surface of the CPU.

As Ludtke created the objects, he gave each one a separate name in Sculpt's Hierarchy dialog box so he could select and manipulate them individually—assigning attributes such as colors, texture maps, and bump maps.

Rendering the illustration—made up of about 12,700 polygons—in Sculpt 4D would have required at least 32MB of memory because Sculpt uses memory-intensive ray tracing to create true reflective images. So Ludtke imported the models into Electric Image (which renders without ray tracing) using Transporter, a utility that opens Sculpt models as well as models created in other 3-D programs. Once the models were in Electric Image, Ludtke could see each of the objects displayed hierarchically in the Project window—as parent objects with child objects listed beneath them. He then selected each object to define its properties.

Because Electric Image provides no texture map libraries, Ludtke made his own in Photoshop. To create the highly reflective chrome reflection map for the sphere and spokes, he pulled the camera high up above the models, set it to a very wide—almost fish-eye—angle, and rendered an overhead view of the scene (after first removing the sphere and the spokes). Using a map of the actual scene—with the same lighting, colors, and tex-

(continues)

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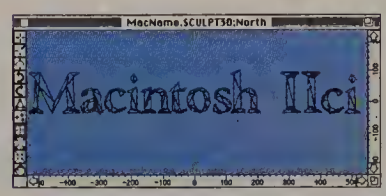
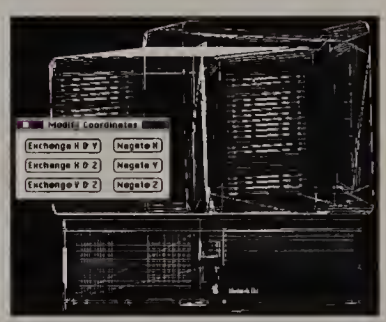
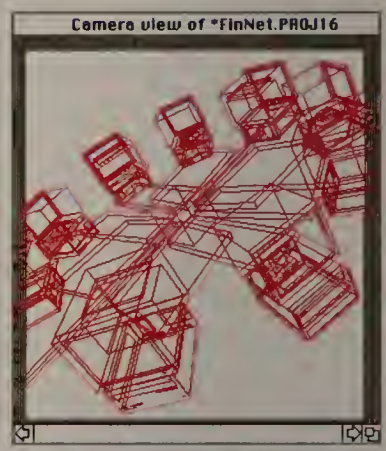
The outlines of the Macintosh IIci logo created in Illustrator 3.0.



The Macintosh IIci outlines after they were imported into Sculpt 4D and converted into 3-D objects filled with numerous polygons.

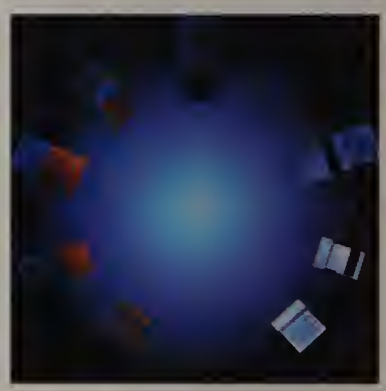


The Mac IIci CPU and monitor as they looked during the importation process from Sculpt 4D into Electric Image using the Transporter utility.



The scene in wire-frame mode after the models were imported into Electric Image.

The plastic reflection map created in Photoshop and used on all the CPUs and monitors.



The chrome reflection map (also created in Photoshop) that was mapped onto the sphere and spokes.

tures—he was able to simulate a realistic-looking reflection. The plastic reflection map for the CPUs and monitors was made with Photoshop's airbrush tool and feathered lasso, then mapped onto the surfaces with a low degree of reflectivity (about 20 percent).

Ludtke did a series of renderings to achieve the effect of a repeating image on the computer screens. First he rendered the finished scene at a low resolution—400 by 550 pixels—and applied it to the screens as a texture map. Next he rendered it again at a medium resolution—600 by 825 pixels—and reapplied it to the screens at a high resolution—800 by 1100 pixels—as the final texture map. The final rendering of the illustration at a very high resolution—4000 by 3000 pixels—took about five and a half hours.

Using Electric Image's masked alpha channel for compositing images onto a background (selecting Calculate from the Image menu to get the Composite dialog box), Ludtke then placed the 3-D image onto a blue gradient background he had created in Photoshop. Masking with the alpha channel has the added benefit of automatically antialiasing the foreground and background images during the compositing process. ■

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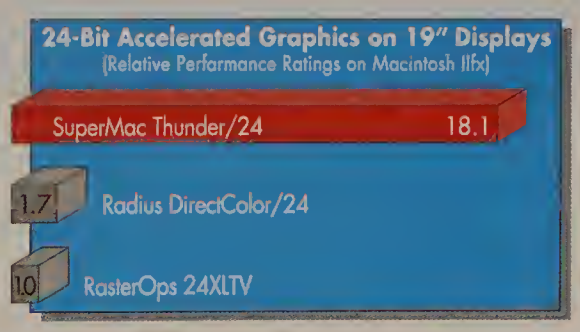
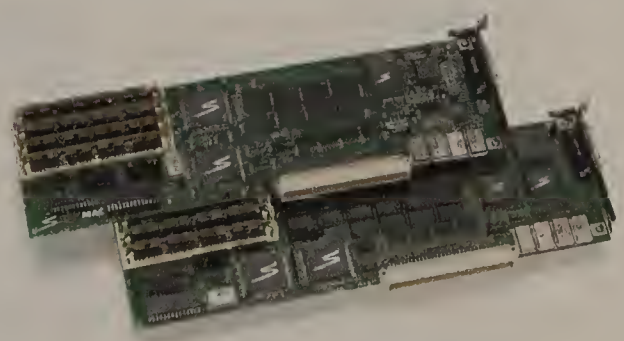


Radius card tested with optional accelerator, requiring an additional slot. Comparisons based on results as of July 1991, running Potrero™ Graphics Performance Benchmarks. All tests run on a Macintosh IIfx in identical configurations. Detailed performance results available upon request.



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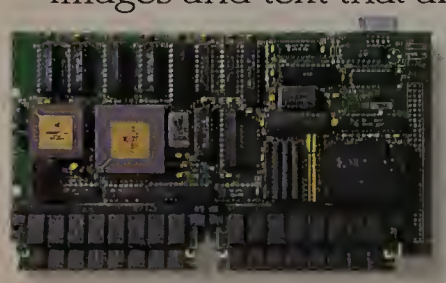

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Cyberspaced

A GENTLE DEMURRAL TO THE HYPE ABOUT VIRTUAL REALITY

BY STEVEN LEVY

One of the nicest compliments you can pay a journalist is that he or she has a bull–you-know-what detector cranked up to a constant ten. I do not boast such a sensitive device, yet lately even my roughly calibrated model has been howling like a car alarm in midtown Manhattan. The culprit is a genuine media frenzy about something called virtual reality.

Virtual reality, or VR, in case you just emerged from a long cave-dwelling experience, is the process by which one's senses are cut off from "normal" reality, which is replaced by the counterfeit reality of high-resolution graphics for your sight (from computer monitors), digital-quality sound for your ears (from speakers), and tactile feedback for your fingers (from special clothing). The difference between virtual reality and other things that muscle out the real world for your sensual attention—movies, television, video games, stereo systems—is that virtual reality uses computers to monitor your responses, process them, and feed you a steady stream of revised information that reflects the changes. Everything in this artificial world is seen from the viewpoint of a single person—you. So if you are touring a room in virtual reality, and you turn your head to the right, a monitor informs the computer that your head has twisted, and the computer pipes the images of the right side of the room to the two little video screens that work like liquid crystal eye patches. This creates the illusion that you are in the room.

MICHAEL LLEWELLYN

Virtual reality fans Jaron Lanier (left) and Timothy Leary.

It is a very neat trick. Despite virtual reality's hapless ratio of failed trips to successful runs, my own experience has convinced me that VR, if you'll pardon the irony, has substance. And considerable promise, particularly in the areas of alternate interfaces for computer applications, real estate simulations where architects show clients through unbuilt buildings, medical visualizations where doctors can practice operations on virtual patients, and scientific visualizations where researchers can study folding techniques of virtual molecules.

But there is promise and there is overpromise. Unfortunately, we live in an age of overpromise, a fin de siècle craziness that seems to have clutched virtual reality to its wacky bosom. For many people a VR headset is sort of a mirror, reflecting their desires for what technology can bring. Thus VR is widely postulated as all things to all people, a potential provider of everything from a business environment to the most exciting sexual partner we've ever imagined. Things haven't gotten this loony since the New Agers tried to abduct quantum physics.

Cyberhype

Here are some recent quotes about virtual reality, culled from a definitive new book, *Virtual Reality,* by Howard Rheingold (Summit Books, 1991), as well as a pile of press clippings that threatens to devour Cleveland:

"It will represent the most profound change since the development of the personal computer."

"I think that this is the biggest thing since we landed on the moon."

(continues)

"The donning of computer clothing will be as significant in human history as the donning of outer clothing was in the Paleolithic."

All the quotes are from estimable folks, albeit ones noted for differing degrees of bluster. The pontificators are, respectively, John Walker, founder of Autodesk; Jaron Lanier, hacker, musician, and businessperson; and Timothy Leary, inventor of Timothy Leary. All three are true to their roots. Walker sees VR as a replacement for the Mac interface; Lanier thinks it will be, like music, a creative medium that can express pure emotion; and psychedelic pioneer Leary sees it as legal LSD. It is significant that all three are motivated to engage in such hyperbole. Enthusiasm has outstripped reality here, be it virtual or earthbound.

The most engaging interviewee in the VR business is Jaron Lanier, who hopes that virtual reality will be a creative force that will liberate people from the current dreary forms of vicarious entertainment. (He calls the effect of these the American Stupor.) Lanier is clearheaded in running his company and has had a hand in several breakthroughs in the technology, but sometimes his visions go over people's heads. A certain quote of his still haunts my neural passageways like some crafty stowaway: With virtual reality, he said, "you can play mountain ranges on the saxophone." This sounds fascinating but it makes no sense.

Lanier is a sincere soul, but his kind of talk is easily misinterpreted. As a result, his ideas have been distorted by the press and by a gang of VR sideshow barkers who see virtual reality as the pinnacle of a new cultural pyramid, sitting just above other techno-hip iconography, like designer drugs, computer cracking, chaos theory, and mirror-shade science fiction. The voice of this strange group is found in the magazine *Mondo 2000,* which, while highly entertaining, joyfully oversells virtual reality in lunatic misproportion. Even some of the advertisements in this daffy periodical reflect the rising VR consciousness—an ad for clothes, for instance, cut extra generously so they won't bind on your forays to Cyberspace, the nonphysical location where VR takes place.

Less enjoyable is the output of an alarming number of academicians who seem to have turned to Cyberspace as an object of scholarly interest. Apparently all the positions for experts on deconstructing television sitcoms have been filled, so an alarming number of professors and social critics have turned to virtual reality—a technology that hasn't even been born yet—to postulate on What All This Means. It seems that on campuses and in major cities, the very mention of virtual reality is enough to pack a lecture hall, and people are assuming podiums with speeches on the semiotics of Cyberspace.

(continues)

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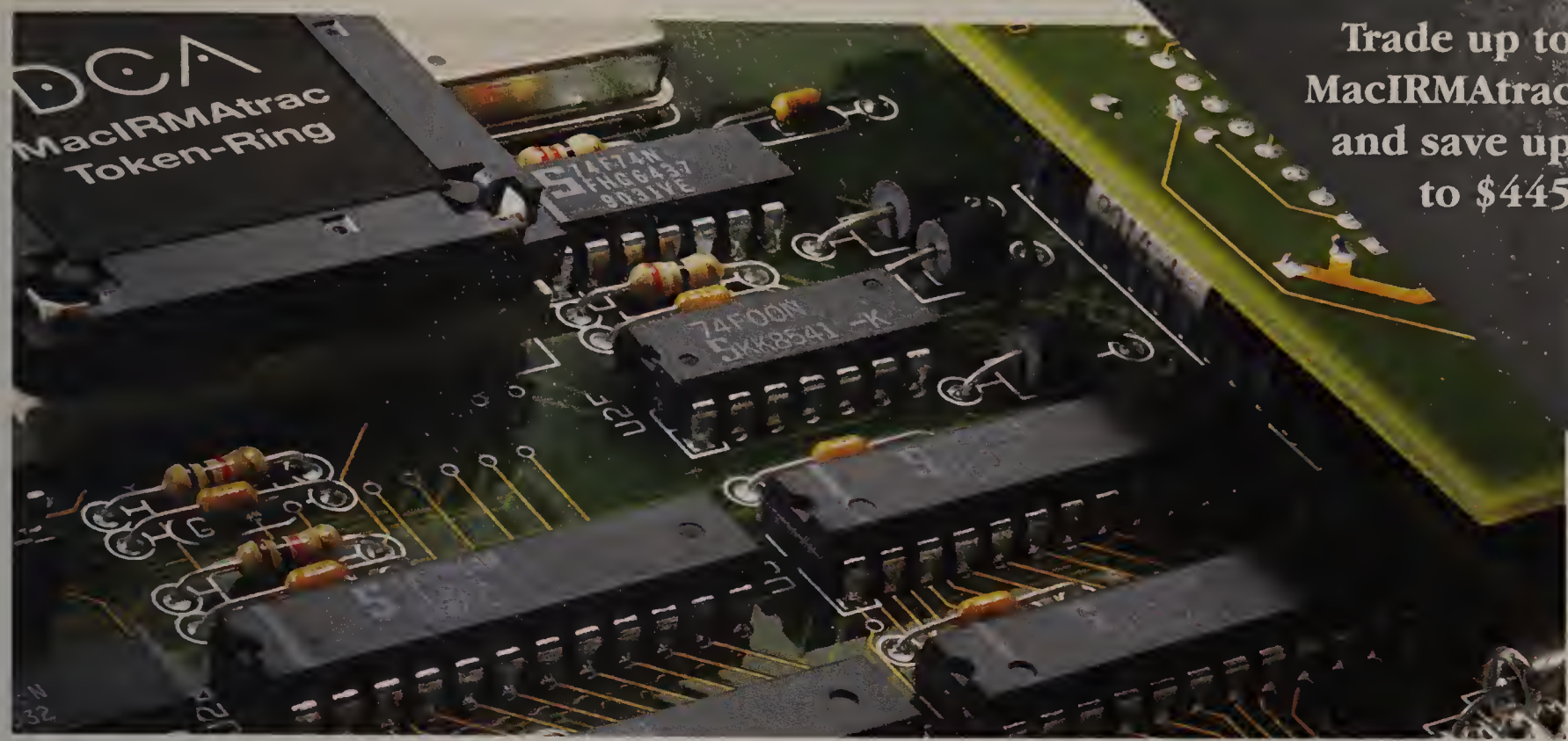

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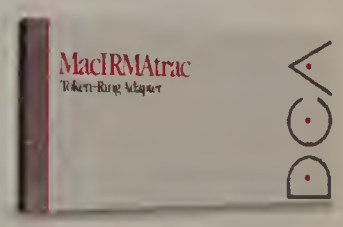

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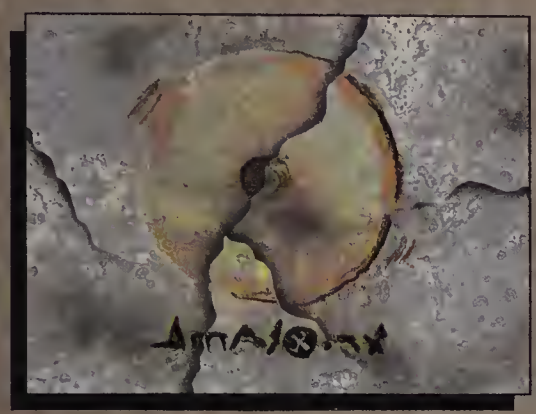
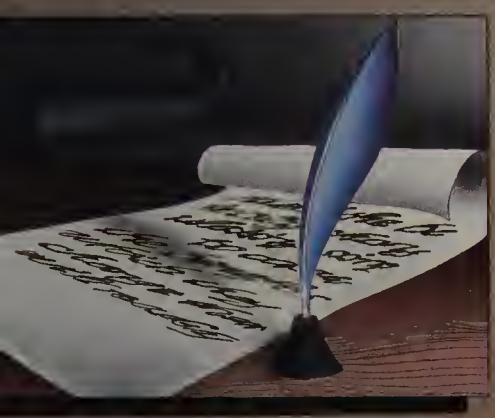
The Evolution of CAD

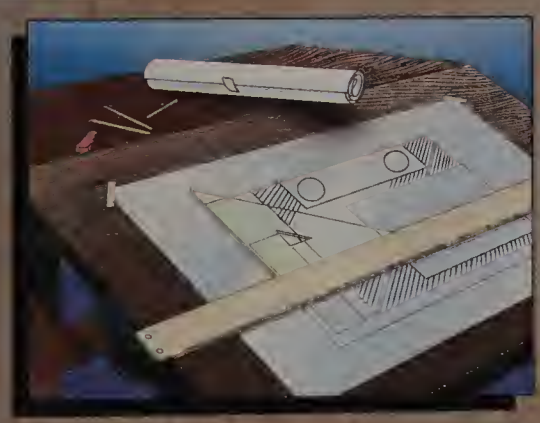
From the beginning of time, man has tried to express himself through graphics.



In the beginning man had to use primitive tools for creating graphic designs.



In the 15th Century design tools were quill ink pens and crude styles of paper.



By the 18th Century man had advanced to the drafting table with the T-squares, slide rules, precision ink pens and the dreaded eraser.

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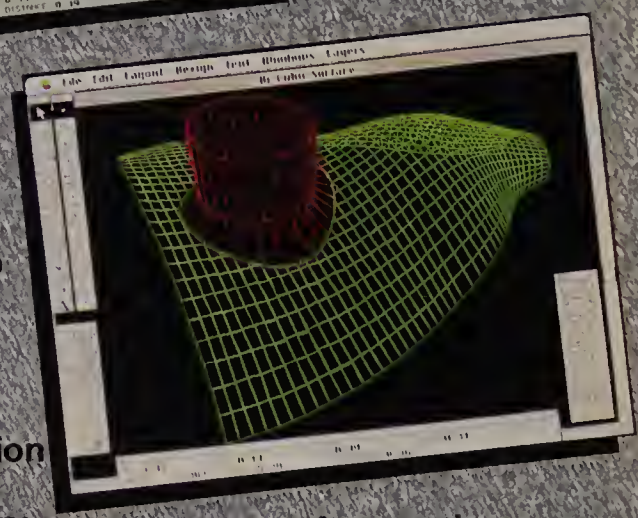

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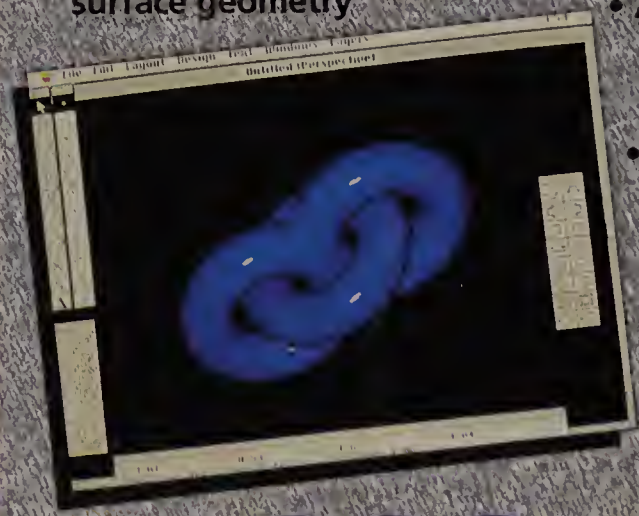

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Future Shock

What's remarkable is that all this hype is occurring when the technology is so primitive. During nearly every VR demo comes an apology from the person strapping you in, something to the effect that "It isn't anywhere near what it will be." You are instructed to use your experience as a clue, an info-artifact that will begin your cerebration on how wonderful things will be when the technology allows VR to fulfill its destiny—reality indistinguishable from the natural world.

But it's mean deception to indicate that VR of that quality is attainable this century, or even in the early part of the twenty-first century. Reality, according to one VR wag, is millions of [computer-generated] polygons a second; our current computers, even very expensive ones, deliver only hundreds. Even though we can reasonably expect great leaps in computer power, the amount of processing to create convincing portrayals of reality is staggering. To come up with a single computer-generated picture that offers the verisimilitude of a fine-grained photograph, it now takes a software wizard with hours of time on a supercomputer. I can't imagine how long it would take to get the power to generate whole worlds—visible from any angle, at 24 frames a second—as well as software that uses that power. And that's just the visual part. Researchers are only beginning to replicate the technology for the other senses, including the most important (and most elusive), tactile feedback. Consider this: it took Apple Computer seven years to get from the Finder to System 7—that's a walk across the street compared with the interstellar leap required to get *real* virtual reality.

Human Nature

My skepticism turns to astonishment at the claim that VR will change the nature of humanity itself. As Rheingold writes in his book, "VR vividly demonstrates that our social contract with our own tools has brought us to a point where *we have to decide fairly soon what it is we as humans ought to become,* because we are on the brink of having the power of creating any experience we desire" (Rheingold's emphasis). Putting aside the questions of who he means by "we" and how "we" will decide this (electronic ballots?), I find this a rare instance of Rheingold becoming affected by the overblown rhetoric of self-appointed VR mystics.

Let's say we could use VR to create any experience, with sufficient fidelity to the original that the subject actually *has* the experience. Would that really change humanity? It might well be the ultimate amusement park, "Disney for epistemologists," as one VR guru put it. But have roller coasters changed human nature? Would simulated trips to outer space or risk-free replications of bungee jumping alter the social fabric?

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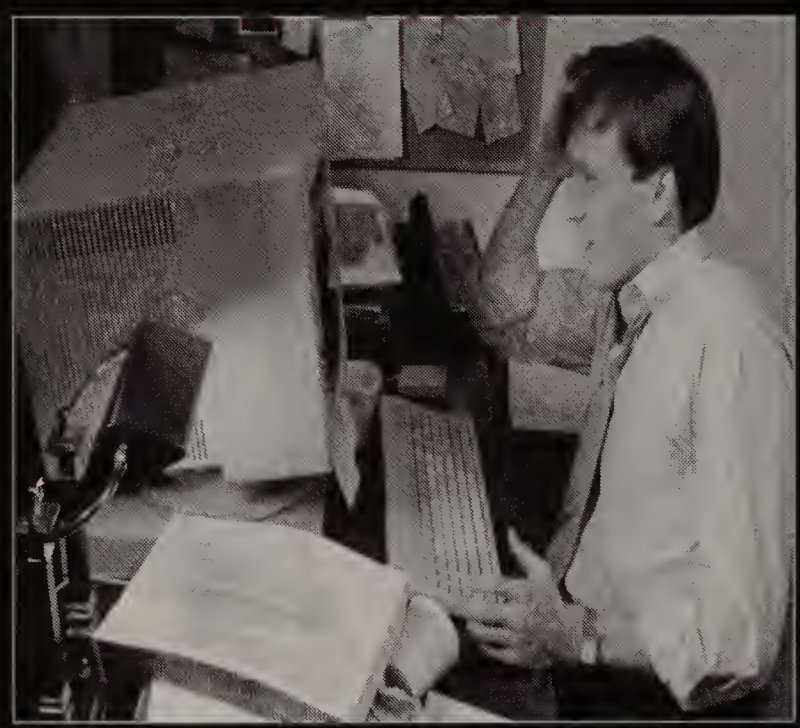
So You're Feeling Squeezed



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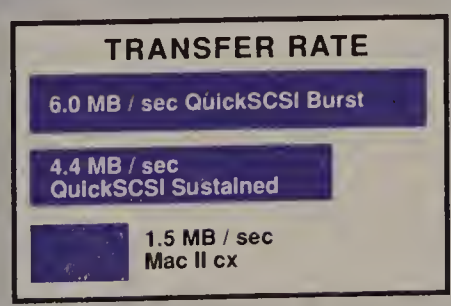

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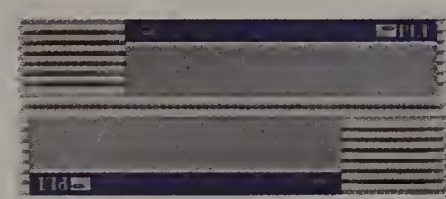

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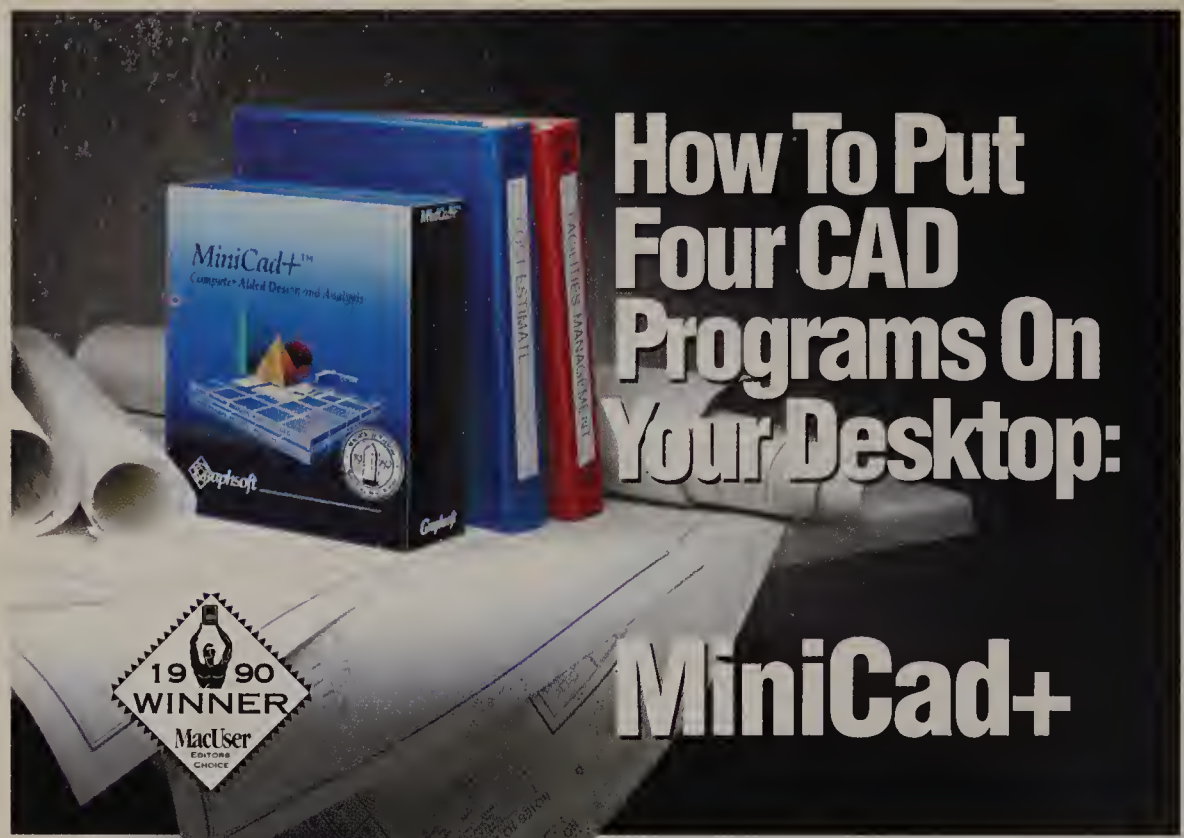

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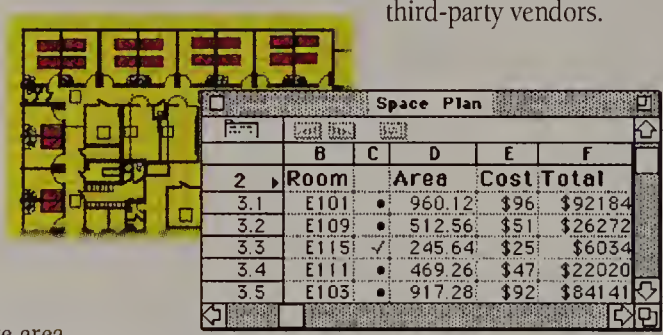

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The truly powerful changes we undergo from exposure to any medium come from the dramatic content and the ideas expressed in that medium. When it comes to expressing ideas, virtual reality, like anything else, is dependent on the ideas being expressed. Lanier's visions aside, it is not yet clear how virtual reality will become the most felicitous medium to express complex and moving ideas.

And as for conveying ideas in narrative form, virtual reality is crippled. The subject is free to explore an artificial world but can't be directed to pay attention to a powerful story. Give me a good mystery book over a solve-the-murder-mystery cruise any day—the latter might get you more fresh air, but the story line by necessity lacks subtlety and deeper meaning.

There's only one way that I think our everyday reality could be seriously affected by VR: if the technology were somehow to reach a point where we could directly hook virtual reality machines into our brains, so that we wouldn't be able to tell whether an experience was real or not. That could put a damper on anybody's day. But the ability to do that is so far into the future, if attainable at all, that speculation on this should be reserved to colloquies held in college dormitories after 2 a.m., after viewing *Total Recall* on videocassette.

Yes, Me Too

Now a confession. I loved William Gibson's book *Neuromancer,* in which the concept of Cyberspace was first introduced (and, to Gibson's horror, appropriated by the VR-oids). I also have a fantasy of playing a game of virtual baseball in my office, with 17 other players strewn across the country, all of us linked in Cyberspace. One day it might happen.

But that day will not come soon. And when it does come, modern civilization will not find itself transformed into something entirely different—only something a little different. For now, a modest plea to the boosters of Cyberspace—Lighten up, folks. After all, it's only polygons. ■

Macworld columnist Steven Levy is writing a book on artificial life.

Turn A New Leaf

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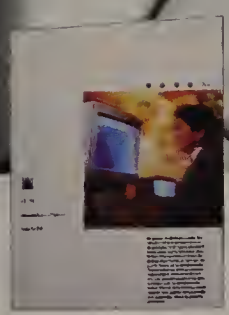

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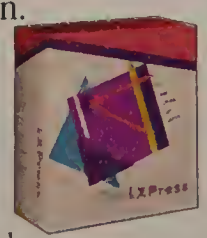

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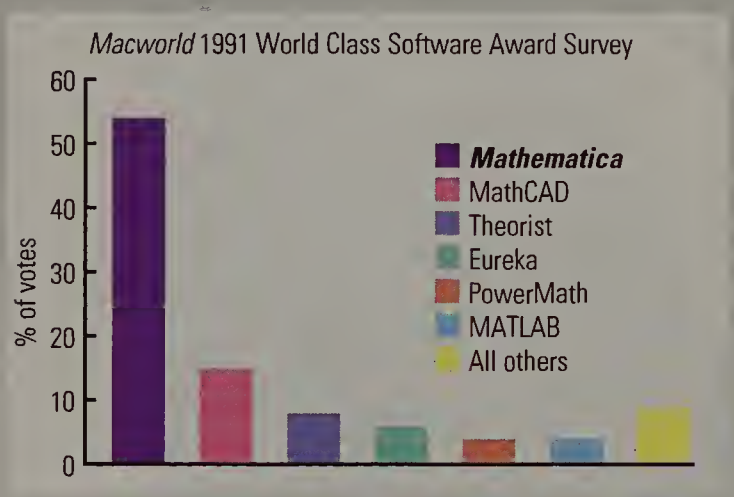

Mathematica has also received best software/new product awards from:

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Mac Products by Mail

YOU CAN GET A GREAT BARGAIN—OR LOSE YOUR SHIRT—WHEN BUYING LONG-DISTANCE

BY DEBORAH BRANSCUM

In May a *Macworld* reader bought a Macintosh LC from CDA Computer Sales of Califon, New Jersey. A local dealer said it would take six weeks to get a system, while a CDA employee told her LCs were in stock and available immediately. "Due to the fact that CDA was advertising in both *Macworld* and *MacUser*, I assumed it was a pretty reputable company," said the reader. She sent a check for a Mac LC and laser printer to CDA at the request of the salesperson. But while the $5200-plus check was cashed immediately, the system never arrived.

In July she canceled her order and began lobbying for a refund. As of press time, it has not arrived.

By September, *Macworld* had received a total of 25 complaints against CDA since April. Until recently, CDA president Marc Daniels promptly resolved complaints we forwarded to his company. But the complaints we sent to CDA between June and mid-August have gone unanswered. What happened? "After 11 years of successful business, CDA Computer Sales is currently having financial difficulties," Daniels wrote in a fax to *Macworld*. "Acquisition negotiations are being held with a major New Jersey corporation. . . . Should this acquisition occur, we should be able to satisfy all customer obligations and will emerge a larger and more financially sound company." Daniels told me that CDA has temporarily trimmed its work force and ordering hours. He also said the company has modified its software so that a customer's credit card is no longer billed before a product ships.

STEVEN PUMPHREY

Bottom Line's Mike Rosenfelt has won more foes than fans as a result of charging customers $2 per minute to order products.

At press time, CDA is not answering its phones and may be in serious trouble. It offers lessons about the dangers of prepaying for mail-order purchases. And some readers, who do not understand that magazines cannot vet their advertisers, feel betrayed by *Macworld* and other magazines that carry mail-order advertisements.

The Art of Commerce

Through advertising, companies often try to make themselves appear more established than they are to win more sales. "Behind that full-page ad may be a company with only two people," said one mail-order executive.

Readers often assume that *Macworld* vouches for the quality of a mail-order or direct-sales company by allowing its advertisements to be published, but that's not the case. Like most other publications, *Macworld*'s advertising department checks only a credit report of a company before accepting its advertising, but that's no guarantee of future solvency or sound business practices. And should an advertiser go out of business, publishers as well as readers are burned. According to court documents, Cork Computer and its mail-order arm, Texas MacStuf, which closed down last spring, owe thousands of dollars to all three major Macintosh magazines.

Mail-Order Macs

Every imaginable product is available via mail order, including Mac systems.

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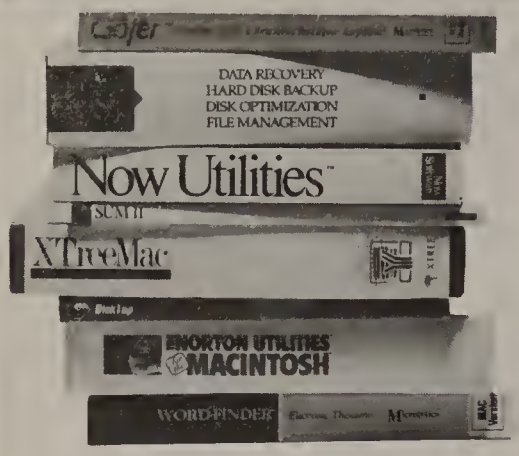
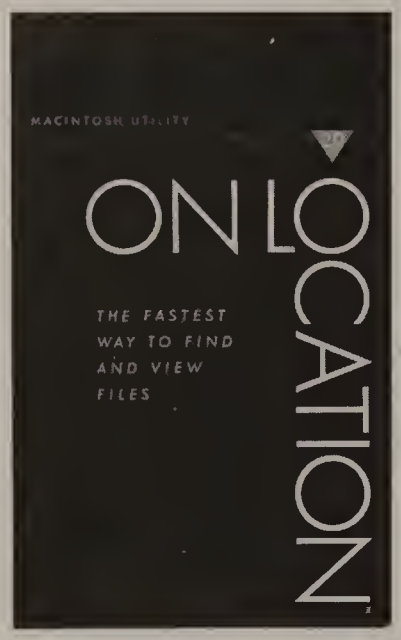


Once a day



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BEHIND THE SCENES

I recently traveled to Austin, Texas, to visit a cross section of mail-order companies. The most interesting may be Bottom Line Distribution, unique in the industry for its 900 telephone line. Customers who call Bottom Line must pay $2 per minute to order products. Some critics say the company is in the phone business. Company president Mike Rosenfelt told me his small company is in the "order-processing business." The 900 telephone number, he said, is a revenue stream and a way to defray overhead costs. That should translate to cheaper prices—but it doesn't always.

"It doesn't make sense to buy a $28 game from us," said Rosenfelt. "You can buy it from MacConnection and get it overnight for a dollar more plus $3 shipping. You can save a lot of money or lose money with Bottom Line. You have to shop selectively."

In response to complaints, Rosenfelt said Bottom Line employees now give out a standard toll number for customers to call if a problem can't be resolved right away. Bottom Line's ads claim that phone charges will not be refunded, but several *Macworld* readers have received refunds because they were forced to call the 900 number for problems. (Some local telephone companies allow you to dispute 900-number charges if you are unhappy with the service received—contact your local service for details.)

Another landmark Austin company is MacProducts, where several other Mac mail-order company founders got their start by working for David Goldman, 26. Goldman started his company as a student in his dorm room by selling floppy disks. Later the product line grew and so did the business, which includes a local retail store. Why buy mail order at all? "Retail and mail order have switched places," said Goldman. "Mail-order technicians have become more knowledgeable. . . . We're problem-solvers."

The mail-order companies in Austin vary tremendously. MacAvenue, for example, is part of CompuAdd, a large mail-order and retail company founded in 1982. Although it's a relatively new division of CompuAdd, it can afford three full-time support technicians, generous return policies, and a large inventory. Company policy prohibits charging credit cards before orders have shipped. At the other extreme is Hardware Express, a small division of AB Computer. Hardware Express customers are asked to prepay for orders. "We are not like MacProducts, which stocks inventory," said executive vice president Sanjiv Mishra. "When we get the money from the customer, that means we're certain and we order the product." Mishra defends prepaid orders because that was the policy at other companies he has worked for. "You'd be surprised at the number of customers who like our service," he said.

It's not illegal, but no Apple-authorized dealers sell Macs by mail, and Apple officially discourages such sales because it needs to "protect its agreement with authorized resellers and make sure the customer stays happy," said Pat Kearney, Apple director of reseller development. In the past 12 months, 15 dealers lost their Apple authorization and 16 more are under investigation, he said.

Mail-order companies offer some terrific prices, reason enough for many people to buy Macs and other products by mail. But there can be pitfalls. If the Mac you buy is not factory-standard—for example, if the serial number is illegible or Apple's internal hard drive has been swapped for a different model—Apple's warranty is void and you are dependent on the mail-order company for any warranty service. Sometimes readers believe they are ordering one thing but get something else. I received one complaint about memory modules sold as 70-nanosecond SIMMs, when in reality they were 120ns. Such occurrences are rare but may happen.

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COMPARING MAIL-ORDER POLICIES

Name of Company	Founded	Delivery [1]	Returns [2]	Restocking Fee	Of Note
Add-On America	1990	2 days	30-day MBP	10% may apply	toll-free technical support; cash discount in some cases
Advance Business Center	1990	1–5 days	15-day MBP	15% may apply	1.75% credit card charge
APS	1985	2 days	30-day MBP	none	3% American Express charge
Aurora Industries	1987	2 days	no free returns [3]	15%	toll-free technical support
Beverly Hills Computer	1988	3–7 days	30-day MBP	15% may apply	toll-free technical support
Bottom Line Distribution	1990	2 days	90-day MBP [4]	15%	$2 per minute phone charge
CDA Computer Sales	1986	varies	30-day MBP	none	see article for more info
ClubMac	1989	2–3 days	30-day MBP	15%	defective products must be returned to manufacturer
Data Computer Center	1986	1–7 days	no free returns [4]	15%	3% credit card charge
Dr. Mac	1988	overnight	30-day MBP [4]	varies	toll-free customer service
Elite Computers & Software	1987	1–2 days	7-day MBP	20%	2% credit card charge
Express Direct	1988	overnight	21-day MBP [4]	varies	toll-free technical support
Hard Drives International	1986	2–4 days	30-day MBP	none	toll-free technical support; 5% American Express charge
International Computer Center	1987	1–4 days	no free returns [5]	15% of invoice	no credit cards accepted
Kiwi Computers	1988	7 days	varies	20% may apply	toll-free technical support; 2% credit card charge
Mac and More	1988	2–3 days	varies	15% may apply	toll-free technical support; 5% American Express charge
MacAvenue	1990	overnight	30-day MBP [4]	none	toll-free technical support
MacCenter	1986	1–4 days	varies	varies	1% prepayment discount
MacConnection	1984	overnight	30–60-day MPB [4]	varies	toll-free technical support
MacDirect	1990	overnight	30-day MBP	10% may apply	toll-free technical support; 5% American Express charge
MacFriends	1988	2 days	varies	15% may apply	2% to 3% credit card charge; $2-per-minute technical support
Mac-In-Stock	1989	7–10 days	no free returns [6]	15%	toll-free technical support
MacLand	1987	1–2 days	varies	20% may apply	toll-free technical support
MacOutlet	1989	1–5 days	30-day MBP	15% may apply	toll-free technical support
Mac'sPlace	1990	overnight	30-day MBP [7]	none	toll-free technical support
MacProducts USA	1985	2–3 days	30-day MBP [4]	15% may apply	lifetime warranty on Magic items
MacSource	1991	3–10 days	no free returns [6]	15%	1% prepayment discount
MacTel Technology	1988	2 days	no free returns [6]	5%	refund or replace defective products
MacTime	1989	2–4 days	7-day MBP	10%	2% prepayment discount
MacWarehouse	1987	overnight	30-day MBP [4]	none	toll-free technical support; online product ordering
MacZone	1986	overnight	30–60-day MBP [4]	none	toll-free technical support; free shipping for 6 p.m.–4 a.m. PST orders
Maya Computer	1988	2 days	30-day MBP	15% may apply	toll-free technical support
Peripheral Outlet	1986	overnight	30-day MBP	20%	toll-free technical support; 3% prepayment discount
Preferred Computing	1987	2–3 days	15-day MBP	none	15 days to return defective products
Relax Technology	1978	1–2 days	30-day MBP	15%	express service available
Third Wave Computing	1985	1–2 days	30-day MBP	15% may apply	toll-free technical support; 3% American Express charge
TMS Peripherals	1990	2 days	30-day MBP	none	toll-free technical support
VCP Computer Products	1989	1–7 days	30-day MBP	varies	toll-free technical support

[1] Refers to standard shipping service. [2] MBP = money-back policy. [3] 30-day return for defects only. [4] Some exceptions. [5] Defective products exchanged or repaired only. [6] Unless defective. [7] Hardware only.

(continues)

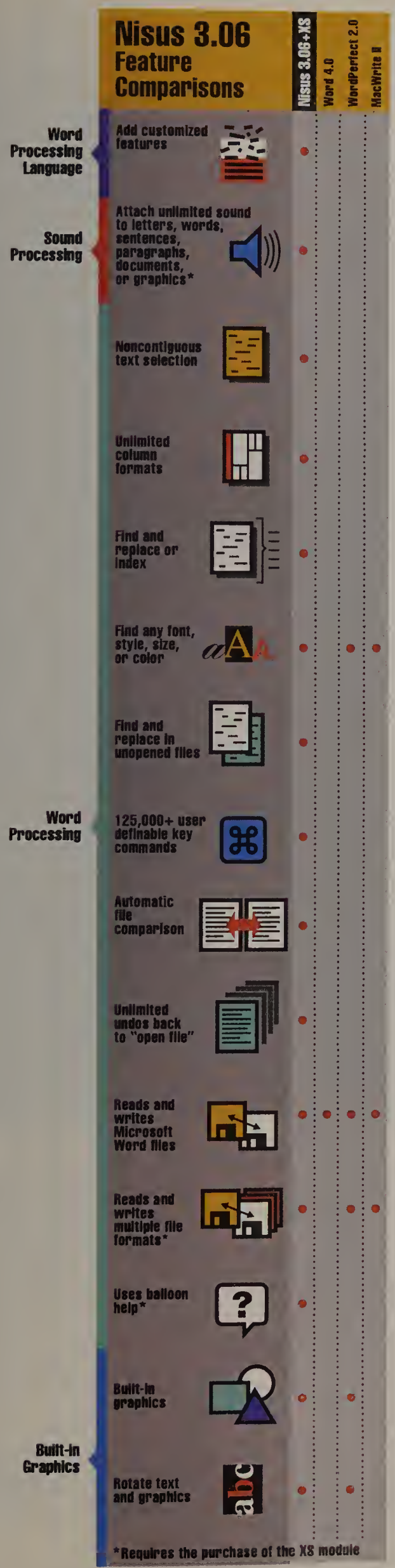
This table is based on information supplied by selected mail-order companies and has not been independently confirmed. It does not constitute an endorsement of any company, nor does it include all Macintosh mail-order firms. Double-check important items such as return policies and shipping fees before placing an order. Note restocking fees. International Computer Center, for example, charges 15 percent of the *total* invoice for returns. Most companies charge a certain percent of the price of the single product being returned.

Most companies will not accept returns of open software. Printers are also a problem; if shipped with a toner cartridge in place, a printer can be ruined. As a result, some companies will not accept printer returns. Mac systems are also nigh-impossible to return. Ship returns in the original packing materials and carton with all books, cables, and related floppies in place. And call for an RMA, or return merchandise authorization, number before returning any product.

In 1991, *Macworld* has received something over 110 complaints involving mail-order and direct-sales companies. The companies with the most complaints as of September are CDA Computer Sales, 25; Jasmine, 24; Bottom Line, 12; La Cie, 11; MacWarehouse, 8; and MacCenter, 7. Bottom Line and MacWarehouse responded promptly to *Macworld* about complaints we forwarded; most were resolved. See column for details about CDA. La Cie responded to the magazine, but not so promptly. *Macworld* has no record of any direct responses from MacCenter about complaints, which may have been resolved. Most of the complaints against Jasmine, which emerged from bankruptcy last year, involve prebankruptcy problems. See *MacBulletin* for more on Jasmine.

The nature of complaints and whether they were promptly resolved is as important as their number. *Macworld* has received complaints that credit cards have been charged or checks cashed for products that have not been shipped against CDA, Hardware Express, Microsell Computer, and MacCenter. This is not illegal, but consumers were unhappy with the practice. Several complaints against La Cie cited poor technical support or poor customer service.

Please keep in mind that no company is perfect. Complaints may represent exceptions to otherwise good service; conditions at a company that have changed since the complaint was filed; or unreasonable expectations on the part of the consumer. Most consumers are happy with the mail-order service they receive. See *Where to Buy* for contact information.



1/2, MacUser Magazine / System 7 Compatible

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COMPUTER PERIPHERALS, INC.™

667 Rancho Conejo Blvd.
Newbury Park, CA 91320

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Circle 237 on reader service card.

Shipping overseas can also be tricky. Some mail-order companies sell software to Switzerland that is incompatible with the Mac's German-language operating system, for example. And many companies do not pay for return shipping—even if they deliver a defective product.

The biggest complaint by far, though, is that hardware orders arrive late or not at all. At Texas MacStuf, for example, even if a product was not in stock, former salesperson Sanjiv Mishra told customers they would get products in seven days "just so I could make the sale." Mishra is now executive vice president of Hard-ware Express in Austin, Texas (see "Behind the Scenes"). A Mac mail-order veteran, he said he tells his salespeople to be honest about delivery.

Protect Yourself

Industry insiders I spoke to offer a range of advice for consumers planning to buy through mail-order companies, which are largely unregulated. Virtually all of them agree—don't send cashier's checks or money orders. Don't patronize companies that don't accept credit cards or that say they will charge your credit card before a purchase is shipped. Do use a credit card—it's your best form of protection when buying by mail. (Poorly managed companies may use the money from orders for business expenses instead of shipping products, and then go out of business.) If your credit card *is* charged before shipment, cancel the order and contact your bank to find out how to dispute the entire amount, including finance charges based on that purchase. Here are some other suggestions:

- Call your user group, check online services, and talk to friends to get recommendations. A good reputation is at least as important as a good price.
- Find out how old the company is. Even officials at new companies agree that longevity is meaningful in the mail-order business. (Still, it's no guarantee, as CDA's problems show.)
- Read the fine print. A "no-questions-asked" money-back guarantee is the best policy for consumers. It gives you the opportunity to try something out.
- Look for hidden costs. They're not illegal, but they're expensive. Credit card orders may cost extra. Restocking fees range up to 20 percent of the purchase price of a returned product. Some companies charge an inexpensive flat fee for shipping; others charge by weight and add an insurance fee.
- Determine in advance who is responsible for a defective product. One reader told me he mail-ordered a printer that was dead on arrival. When he called to complain, an employee said, "We sell printers, we don't fix them," and referred the customer to the printer manufacturer.
- Try before you buy. Call a company with technical questions before you place an order. If you can't get answers before you buy, don't expect much help afterward. If you've never purchased from the company before, make a small trial purchase. Save larger orders for companies you know.

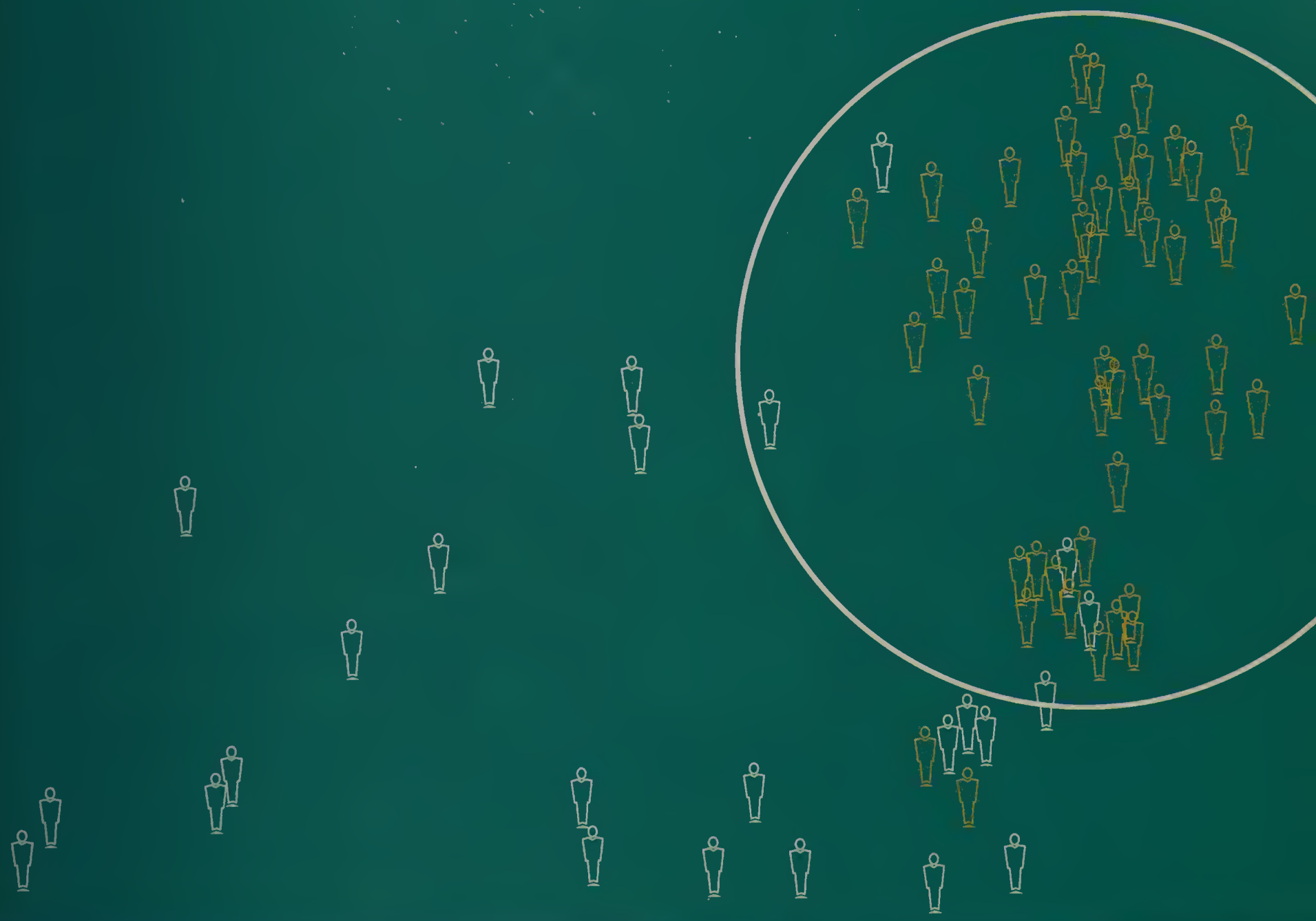
Where to Buy

Only you can decide who to do business with—*Macworld* can't endorse any mail-order company. I did ask industry insiders for their picks. MacConnection won hands down, not for its prices but for its fast delivery and money-back guarantees. MacWarehouse, MacAvenue, and MacZone were also mentioned—by small competitors as well as large ones—as sure bets for most consumers. The four companies are the largest in the Mac mail-order industry and offer similar though not identical services, such as $3 overnight shipping and toll-free technical support. (Some smaller companies offer these services also).

Who do you vote for? Let me know about your good and bad mail-order experiences so I can continue to cover mail-order shopping in upcoming columns. And remember—never, ever prepay for a mail-order purchase unless you can afford to lose the entire amount. But don't give up on mail order. Most of the time, it's a great way to shop. ■

Send nominees for sainthood to Service Heroes, Macworld, *501 Second St., San Francisco, CA 94107, or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop Conspicuous Consumer a line if a company is ignoring you.*

Plot Their Next Move.



And start planning yours. Statistical software from SPSS helps you perform all types of market research. . . from survey and product packaging research to direct response and customer satisfaction analysis. You'll have the power to enter, edit, manage, analyze and present data with the most in-depth statistical software available. Software that helps 26 of the top 30 market research firms target segments and interpret buying behavior more effectively. Move to SPSS, suppliers of statistical solutions to over 2 million users worldwide. Call 1(800) 45-STATS or FAX (312) 329-3668.
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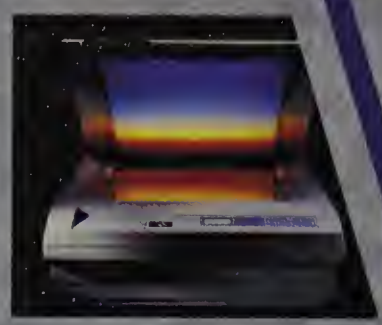
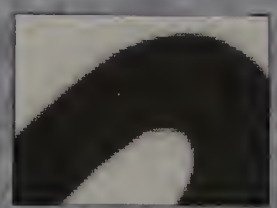


We're proud

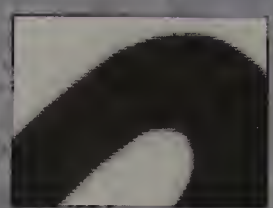
Microtek 600ZS $2,195*

Howtek Scanmaster 3 $8195**

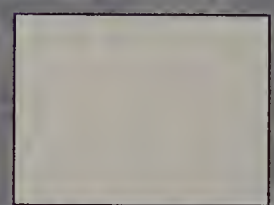
La Cie Silverscanner $1,999



Microtek 600ZS
300 dpi at 1600%



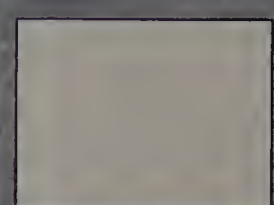
Microtek 600ZS
600 dpi at 800%



Microtek 600ZS
1200 dpi at 400%—n/a

Howtek Scanmaster 3
300 dpi at 1600%

Howtek Scanmaster 3
400 dpi at 1200%



Howtek Scanmaster 3
1200 dpi at 400%—n/a

Seeing is believing.

That's why we at La Cie want you to see how good our Silverscanner really is. We're so confident in the quality of our scanner image that we are willing to compare it to other scanners right here in front of you. Compare for yourself.

Great color the first time.

Just look at the difference in the color scans. The single-pass Silverscanner has three separate noble gas-filled lamps for red, blue and green that are balanced so you get great scans the first time. With Silverscanner's built-in gamma correction, you get clean, bright scans with excellent detail in those hard-to-get areas that don't require difficult adjustment like other scanners. This can mean substantial time savings when every second counts.

The shadow knows.

Do you want good shadow detail? Then compare the black and white scans. The Silverscanner can give you production quality gray-scale scans for magazines, newspapers and brochures.

Lay it on the line.

When it comes to scanning line art, the Silverscanner really shines! At 1200 dpi you get what amounts to an ***electronic stat***. Compare the scans of line art shown here. The comparison is incomplete, however, because some scanners don't have hi-res capability (too bad). But even if you compare at 400 or 600 dpi, it's clear how much better the Silverscanner is, especially if you look at the price!

La Cie Silverscanner
$1999

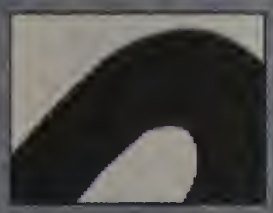
Price does not include shipping. Add 5% surcharge for American Express. Add sales tax where applicable. La Cie is a trademark of La Cie, Ltd., a Quantum Company. All other trademarks are the property of their respective companies.
*Price advertised in Macworld, Sept. 91. **From Howtek price list, effective 3-1-91. All specifications, terms, descriptions, products and services herein are subject to change without notice or recourse. Bundles in U.S.A. only.
Ad design and production by Graphic Witness. Subject photos by Dennis Carney. © Copyright 1991 La Cie, Ltd., 19552 SW 90th Court, Tualatin, OR 97062. Phone: (503) 691-0771, Fax: (503) 691-5590). All rights reserved. Printed in U.S.A.

# of our image.

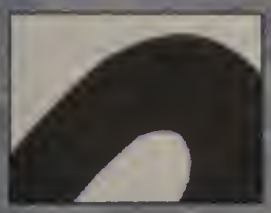
Microtek 600ZS $2,195*

Howtek Scanmaster 3 $8195**

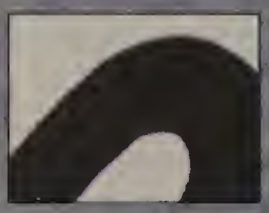
La Cie Silverscanner $1,999



La Cie Silverscanner
300 dpi at 1600%



La Cie Silverscanner
600 dpi at800%



La Cie Silverscanner
1200 dpi at 400%

La Cie Silverscanner
1200 dpi at 100%

All scans were done at default settings with no corrections. The color images were separated using Adobe Photoshop. The logo was scanned as grayscale and as line art. This entire ad was done on the Macintosh using Silverscanner, Photoshop, Quark XPress and a PostScript Imagesetter. The entire production cost was $145.

Software to die for!

We're proud of our image when it comes to quality software, too. La Cie has always had a reputation for powerful, well-written software and Silverscan plug-ins are no exception. La Cie's exclusive plug-in modules for Photoshop, ColorStudio, Digital Darkroom, Enhance, ImageStudio and RagTime have been hailed as some of the best software ever written for flat-bed scanners. With features like fast dynamic ***color*** previews, independent color and brightness controls, nine scanning modes, savable scan settings, proportional scaling, color dropout, magnified previews, proof scans, 25% to 400% scaling in 1% increments, and 25 dpi to 1200 dpi in 1 dpi increments. And Silverscan is OCR and Apple System 7 compatable.

As a special bonus, Silverscanner comes with full versions of Adobe Photoshop ***and*** Letraset's ColorStudio— a $2139 value!

Who ya gonna call?

La Cie can offer you (toll-free) expert technical support after the sale. We know scanning inside and out. From line art to color separations, we can help you. And we'll be here for you tomorrow. La Cie is a Quantum Company, backed by $400 million in assets.

Image is everything.

La Cie is so proud of the Silverscanner, we used it to produce this ad. Not just the comparisons, ***everything.*** If you like our image, this is the scanner you've been waiting for. Just call and order yours today.

"The choice is clear . . . buy the La Cie Silverscanner."
Macworld, June 1991

LACIE
LIMITED
A QUANTUM COMPANY

To order or for more information, call toll-free
800-999-0143

EVERY TOM, DICK & HARRY

Not to mention, Sue, Jane and Mary. Presenting The Complete Small Business Accounting System That Lets Everyone In Your Office Access Financial Information. At The Same Time.

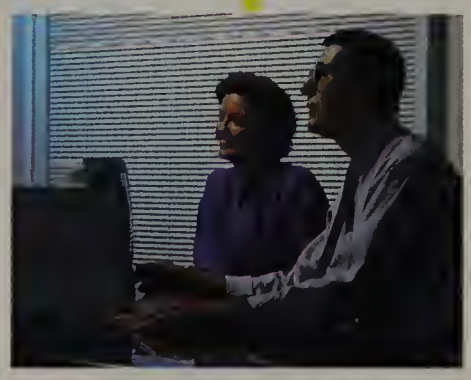
Accountant, Inc./MultiUser is the solution small businesses have been waiting for. It's the only complete fully-integrated multi-user accounting system for the Macintosh that's so innovative, so flexible, and so affordable it has everybody talking.

It's Everything A Business Accounting System Should Be. And Then Some.

AI/MultiUser is easy to learn. And easy to use. It's System 7 compatible. And so comprehensive it'll perform a full range of accounting and management functions seamlessly.

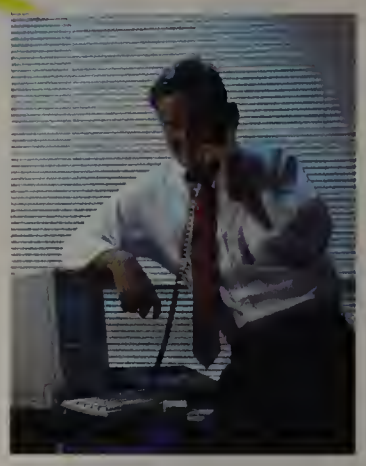
There's payroll and inventory. General ledger. Payables/receivables. Invoicing. Check writing. And AI/MultiUser also lets you create over 100 reports–like income and customer statements–to help you run your business more effectively.

AI/MultiUser's individual record-locking system allows all your employees to access data at the same time. And because it instantly updates all your important financial information automatically, everyone has what they need when they need it. So, no matter how big your business gets, Accountant, Inc. will expand to meet your needs.



Get Up And Running In No Time.

Like our Single User version, AI/MultiUser is a snap to set up. It runs on any Mac network. There's no complicated hardware to buy. And no time-consuming training needed. What's more, AI/MultiUser is backed by a nationwide network of qualified, independent installers who can get your system up and running fast. And our technical support hotline is always ready to give you the help you need.



Get $75 Cash Back And A More Profitable Future. Just Call 1-800-933-2537.

There's never been a better time to get the most comprehensive small business accounting system available on the market. Just give us a call at 1-800-933-2537 and we'll rush you a certificate for $75 cash back when you purchase either Accountant, Inc. Single User or MultiUser.*

So start spreading the word. And the facts. And the figures. AI/MultiUser is going to make every Tom, Dick and Harry more productive. And that should make your business very good, indeed.

Accountant, Inc. suggested retail price: $595; MultiUser (3 users) introductory price: $995 (suggested retail: $1295); Additional user modules, introductory price: $195 (suggested retail: $295); Upgrade to MultiUser: $300 or $250 with extended support.

Accountant, Inc.™
Accountant, Inc.™/MultiUser

1(800)933-2537, 800 S.W. 37th Avenue, Suite 765, Coral Gables, Florida 33134

Softsync/BLOC

*In addition, you'll receive one free hour of telephone consultation with one of our Qualified Installers. Valid for purchases made between October 1 and December 31, 1991.

Requires: Apple Macintosh with at least 2 megabytes of memory and hard disk. Works with Plus, SE, SE/30, II, IIx, IIcx, IIfx, Portable, Classic, si, LC, ImageWriter, LaserWriter, StyleWriter, Appleshare and Multifinder.

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Circle 367 on reader service card

UPDATES

This section lists the latest versions of selected Mac applications that were announced by the time we went to press. To have products considered for this section, send a press release to Updates, Macworld, 501 Second St., San Francisco, CA 94107, or fax it to 415/442-0766.

PRODUCT	V.	REQ.	★	$
4TH DIMENSION	2.2	1MB/6.0		$99
AATRIX CHECKWRITER II	3.02	512K/4.1		*
ACCOUNTANT, INC. PROFESSIONAL	2.1	1MB/6.0.3		*
ACCUTEXT	2.0	4MB/6.0.2		*
ADDRESS BOOK PLUS	2.0	1MB/6.0.2		$25
ADOBE ILLUSTRATOR	3.0	2MB/6.0.3	2/91	*
ADOBE PHOTOSHOP	2.0	2MB/6.0.2	9/91	$199
ADOBE TYPE MANAGER	2.0	1MB/6.0.2		FREE
AFTER DARK	2.0	512KE/4.1	5/91	*
AGFATYPE	2.0	2MB/6.0.2		FREE
ALDUS DIGITAL DARKROOM	2.0	1MB/6.0	9/91	*
ALDUS FREEHAND	3.0	1MB/6.0.3	8/91	*
ALDUS PAGEMAKER	4.0.1	1MB/4.1		FREE
ALDUS PERSUASION	2.0	1MB/6.0.5		*
ALDUS SUPER 3D	2.5	2MB/6.0.5		*
ALDUS SUPERPAINT	3.0	1MB/6.0.5		$65
ANTITOXIN	1.4	512K/3.2		$15
APPLESHARE FILE SERVER	2.0	512K/3.2		*
ASHLAR VELLUM	2.0	4MB/6.0.2		$95
ATONCE	1.2	1MB/6.0.5		*
A/UX	2.0	4MB/6.0.5		*
BACKFAX	1.5.1	1MB/6.0.3		$25
BACKMATIC	2.0	1MB/4.2		*
BILL-IT	2.6	1MB/6.0.3		*
BITSTREAM TYPEFACE LIBRARY	2.0	1MB/6.0		*
BUSINESS SENSE	1.4.1	1MB/6.0		*
CA-CRICKET PRESENTS	2.0.1	1MB/6.0		*
CANOPENER	1.1	512K/3.0		FREE
CANVAS	3.0	1MB/6.0.2		*
CAPTURE	4.0	1MB/6.0		$30
CARBON COPY MAC	2.0	1MB/6.0.5		*
CLARIS CAD	2.0.2	2MB/6.0		$79
CMS UTILITIES	7.0	2MB/7.0		$25
COLOR MACCHEESE	2.07	1MB/6.0.5		$15
COLORSTUDIO	1.5	4MB/6.0.5		*
COMPUSERVE INFORMATION MANAGER	1.5	1MB/4.1	12/90	*
COMPUSERVE NAVIGATOR	3.0.4	512K/4.1	12/90	*
CONCERTWARE	5.1	512KE/4.2		$35
CORRECT GRAMMAR	2.0	1MB/4.2		*
DELTAGRAPH PRO		2MB/6.0.5		$75
DELUXEMUSIC CONSTRUCTION SET	2.5	512K/6.0.2		*

PRODUCT	V.	REQ.	★	$
D.E.S. DOCUMENT EXCHANGE SYSTEM	4.1	1MB/6.0		*
DESIGNCAD	3.0	2MB/6.0.5		*
DESIGNSTUDIO	2.0	1MB/6.0	11/91	*
DESKPAINT	3.03	1MB/4.2		FREE
DISKDOUBLER	3.7	1MB/6.0.2	12/90	$15
DISKEXPRESS II	2.07	1MB/6.0		*
DISKFIT AND NETWORK DISKFIT	2.0	1MB/6.0	7/91	*
DISKTOP	4.01	1MB/6.0		*
DISPLAY ADBUILDER	1.1	1MB/6.0.3		*
DOLLARS & SENSE	5.0	512KE/3.2		*
DOUBLE HELIX	3.5	1MB/6.0		$99
DREAMS	1.1	1MB/6.0.2		*
DYNAPERSPECTIVE	2.04	2MB/6.0.4		FREE
DYNODEX	2.0	1MB/6.0		$25
EASY COLOR PAINT	2.0	1MB/6.0.2		*
EMPOWER II	4.01	1MB/4.2		*
FASTBACK II	2.1	512KE/4.1		$30
FAST FORMS	2.0	1MB/6.0		$25
FASTLABEL	2.02	1MB/6.0		*
FASTTRACK	1.5	512KE/5.5		$20
FAXGATE (QUICKMAIL)	1.5	1MB/6.0.5		$9/workstation
FAXGATE (MICROSOFT MAIL)	3.0	1MB/6.0.5		$9/workstation
FILEMAKER PRO	1.02	1MB/4.2	2/91	FREE
FILEVISION V	1.1	1MB/6.0.2		*
FILMMAKER	2.5	5MB/6.0.3	3/91	*
FINALE	2.6	1MB/6.0.2		FREE
FINDSWELL	2.01	512KE/3.2		*
FONTOGRAPHER	3.3	1MB/4.0.3		*
FONTSHARE	2.2	1MB/6.0		FREE
FONTSTUDIO	2.0	1MB/6.0.5		*
FOXBASE+/MAC	2.01	1MB/6.0		FREE
FRAMEMAKER	3.0	1MB/6.0	1/91	*
FREEDOM OF PRESS LIGHT	3.0.1	2MB/6.0.3		FREE
FREEDOM OF PRESS PROFESSIONAL	3.0.2	4MB/6.0.3		$100
FULL IMPACT	2.0	1MB/6.0		$50
FULLWRITE PROFESSIONAL	1.5	2MB/6.0.2		*
GENERIC CADD	1.1	1MB/6.0.5		*
GEOQUERY	2.0	1MB/6.0		*
GOFER	2.0	1MB/4.1		$25
GRACELAN	2.0	1MB/6.0.5		*
GRAMMATIK MAC	2.05	1MB/6.0		$15
GREAT GANTT	1.4	1MB/6.0	12/90	*

PRODUCT	V.	REQ.	★	$
GREAT PLAINS ACCOUNTING SERIES	5.35	1MB/6.0		*
HAND-OFF II	2.2	1MB/6.0.5		$35
HYPERANIMATOR	1.5.2	1MB/6.0.3		*
HYPERCARD	2.1	1MB/6.0.3		$49
HYPERDA	2.0	512K/3.2		*
HYPERWINDOWS	1.2	1MB/6.0.2		$20
ICON-IT	2.1	1MB/6.0.2		*
IF:X FORMS DESIGNER	1.1	1MB/6.0	12/90	FREE
IMAGESTUDIO	1.5	1MB/6.0		$99
INFOLOGIC ENVELOPE	1.1C	512KE/4.0		$5
INITPICKER	2.02	1MB/6.0		$10
INSIGHT EXPERT ACCOUNTS PAYABLE	2.1.1	1MB/6.0		*
INSIGHT EXPERT ACCOUNTS RECEIVABLE	2.2	1MB/6.0.2		*
INSIGHT EXPERT GENERAL LEDGER	2.2	1MB/4.2		$99
INSPIRATION	3.0	1MB/4.2		*
INSTANT-EXPERT PLUS	2.0	1MB/5.0		FREE
INTOUCH	1.1	1MB/6.0.5	5/91	FREE
KALEIDAGRAPH	2.1	2MB/6.0.5	9/91	$20
KIWIENVELOPES	3.1	512KE/4.1		*
LABVIEW	2.1.1	4MB/6.0.5	10/91	*
LAPLINK MAC III	3.2	512K/2.0		FREE
LAPLINK MAC PLUS III	3.0	512K/2.0		*
LASERPAINT COLOR II	1.02	1MB/6.0.3		FREE
LETRASTUDIO	1.5	2MB/6.0		$45
LIGHT CHECKBOOK ACCOUNTING	2.0	1MB/6.0.3		*
LIGHTSPEED COLOR LAYOUT SYSTEM	2.5	1MB/6.0.5		*
MACANALYST	2.0	2MB/6.0		$125
MACARCHITRION	5.5	2MB/6.0.3		*
MACDRAFT	2.1	1MB/6.0.2	12/90	*
MACDRAW II	1.1	1MB/6.0		*
MACDRAW PRO	1.0	1MB/6.0.5	11/91	$99
MACENVELOPE	5.0	512KE/3.2		$25
MACENVELOPE PLUS	2.0	512KE/3.2		$50
MACFLOW	3.5	1MB/6.0.3		*
MACLINKPLUS/PC	5.0	1MB/6.0.2		*
MACMONEY	3.5	512KE/4.0		$12
MACPHONEBOOK	3.0	1MB/6.0	9/91	*

(continues)

V. = version #. **Req.** = min. RAM and system software required.
★ = last time (in the past year) this or an earlier version reviewed.
NA = first version, not applicable.

$ = cost of update to registered owners.
* = contact your dealer for update policy.

Blue = new version.
Yellow = reviewed product.

PRODUCT	V.	REQ.	★	$
MACPRDJECT II	2.5	1MB/6.0		$99
MACRECORDER	2.03	512K/3.2		*
MACRDMIND DIRECTDR	3.0	2MB/6.0.5		$195
MACSCHEDULE	2.5	1MB/6.0		$30
MACTERMINAL	3.0	512K/3.2		$65
MACTDDLS DELUXE	1.2	1MB/6.0	1/91	*
MACTDPS	3.1	1MB/6.0.5		*
MACWRITE II	1.1	1MB/6.0		FREE
MANAGING YDUR MDNEY	4.0	1MB/6.0.3		*
MAPGRAFIX	2.1.1	4MB/6.0.3		*
MARCDPDLD	1.1	1MB/6.0		FREE
MARKET MASTER	3.0	1MB/6.0.3		$95
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MICRDSDFT MAIL	3.0	1MB/6.0.2	8/91	*
MICRDSDFT PDWERPDINT	2.01	1MB/6.0		FREE

PRODUCT	V.	REQ.	★	$
MICRDSDFT PRDJECT	1.1	1MB/6.0.4	11/91	NA
MICRDSDFT WDRD	4.0	512KE/3.2		*
MICRDSOFT WORKS	2.0	512K/6.0		*
MINDLINK	2.0	1MB/6.0		*
MINDWRITE	2.1	512KE/4.2		*
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MDCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		$15
MDDELSHOP II	1.1	1MB/6.0.2		FREE
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M.Y.D.B.	2.0	1MB/6.0	10/91	*
MYTIMEMANAGER	3.5	1MB/6.0.3	11/91	*
NETMINDER ETHERNET	1.2	2MB/6.0		*
NETWDRK BUNDLE FDR THE MAC	3.0	512K/3.2		*
NISUS	3.05	1MB/6.0.2	2/91	*
THE NORTON UTILITIES FOR THE MACINTDSH	1.1	1MB/4.2	2/91	$19
NOW UTILITIES	3.0	1MB/6.0.4	7/91	$29
NUBASE FOR THE MAC	1.3	1MB/4.1		$75

PRODUCT	V.	REQ.	★	$
DMNIPAGE	2.1	1MB/6.0.2		FREE
DMNIS 5	1.2	1MB/6.0		*
DNCUE	1.3	512K/4.2		$10
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PRO-CITE	1.3.4	512K/4.1		*
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PROFESSIDNAL CDMPDSER	2.3	1MB/6.0.3		FREE
PRDGRAPH	2.0	2MB/6.0		*
PROPSFORMS	2.0	1MB/6.0.3		FREE
PROTDTYPER	3.0	1MB/4.1		$99
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PRODUCT	V.	REQ.	★	$
PYRO	4.0	512K/4.1		$15
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QUICKDEX II	1.4D	1MB/6.0.5		*
QUICKEN	3.0	1MB/6.0.5		*
QUICKEYS²	2.1	1MB/6.0.2	1/91	*
QUICKLETTER	1.1.5	1MB/6.0		$25
QUICKMAIL	2.5	512KE/3.2		*
QUICKSHARE	2.0	512KE/3.2		*
QUICKSHOT	2.1	1MB/4.2		$5
RAGTIME 3	3.1	2MB/6.0		$150
READ-IT OCR PERSONAL	2.1	1MB/6.0.3		$29
READ-IT OCR PROFESSIONAL	3.0	2MB/6.0.3		*
READYSETGO	4.5	1MB/6.0		*
RETROSPECT REMOTE	1.3	1MB/6.0		*
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SCHEDULEMAKER	3.01	1MB/6.0		$25
SMART ALARMS	3.07	1MB/6.0.2	12/90	$40
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SMARTSCRAP & THE CLIPPER	2.01	1MB/6.0.3		*
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PRODUCT	V.	REQ.	★	$
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SUPERNOVA	1.1	1MB/6.0.2		FREE
SUPERGLUE II WITH GLUENOTES	2.1	1MB/6.0		*
SUPERLASERSPOOL	2.0.2	1MB/6.0		$30
SUPERSPOOL	5.0	512K/4.1		$30
SWIVEL 3D	1.2	1MB/6.0.5		$49.
SWIVEL 3D PRO	2.0	4MB/6.0.5		$150
SYSTAT	5.1	2MB/6.0		*
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THEORIST	1.1	1MB/6.0		*

PRODUCT	V.	REQ.	★	$
THINK C	4.0	1MB/5.0		*
THINK PASCAL	4.0	1MB/6.0		$69
THUNDERWORKS	1.2	1MB/6.0.2		*
TIMBUKTU	4.0	1MB/4.1		*
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TIMESLIPS III	2.0	1MB/6.0.2		*
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TYPEREUNION	1.01	1MB/6.0		FREE
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VIRTUAL 2.0 FOR MAC II	2.04	1MB/4.2		FREE
VIRTUAL 2.0 FOR MAC PLUS	2.04	1MB/4.2		FREE
WHITE KNIGHT II	11.12	1MB/6.0.2		*
WILLMAKER	4.0	512KE/4.2	3/91	$18.50
WINGZ	1.1	1MB/6.0		FREE
WORD FINDER	2.0	512K/3.2		*
WORDPERFECT FOR THE MACINTOSH	2.0	1MB/6.0.5	7/91	$89
WORKSPLUS SPELL	2.0	1MB/6.0.3		$35
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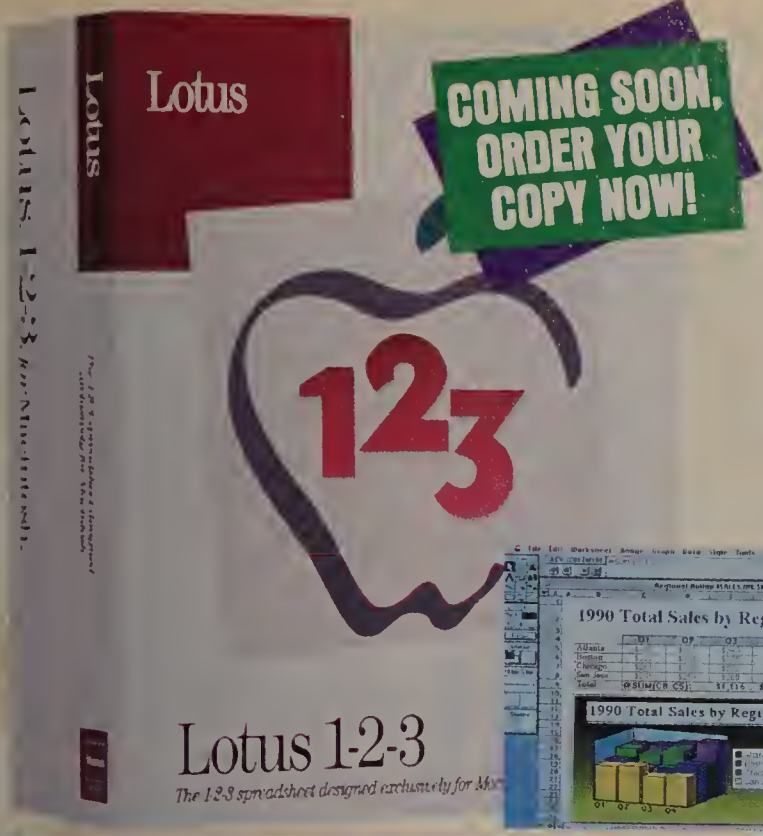

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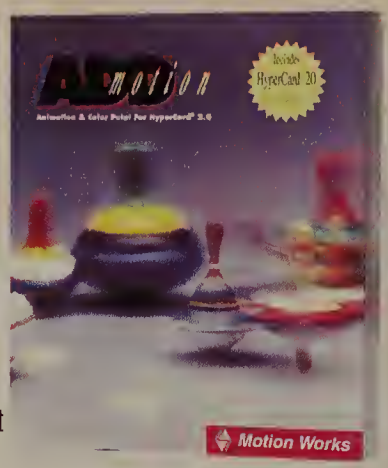

Motion Works ADDmotion

$182 ADDmotion is the first animation and color paint program to be fully integrated with HyperCard 2.0. You can quickly and easily add animation, color and sound to any HyperCard stack. Anyone can create exciting presentations, develop interactive training systems, or simply have fun. ADDmotion includes HyperCard 2.0. #03985

Koala Technology MacVision

$258 MacVision is an easy-to-use video digitizer for your Mac which captures images of 3-D objects. You can then edit, print, and save these images as files in a variety of formats. MacVision produces images with 256 shades of gray for use in most popular publishing and graphic arts programs. #03705

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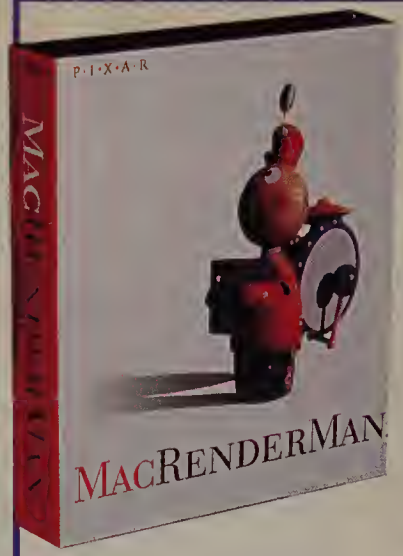


PIXAR Showplace and MacRenderMan Bundle

$548 Pixar Showplace™ / MacRenderMan™ is a complete picture-making tool. You orchestrate objects, lights and cameras, just like a photographer arranges a studio. It accepts models from any application that outputs RIB files. #00030

MacroMind THREE-D 1.0

$1149 A professional tool for creating high quality 3D animations and photorealistic images for use in video and multimedia production. Three-D gives you a hierarchical time-line to easily and precisely animate unlimited shapes, lights and cameras. #00838

MacroMind Director 3.0

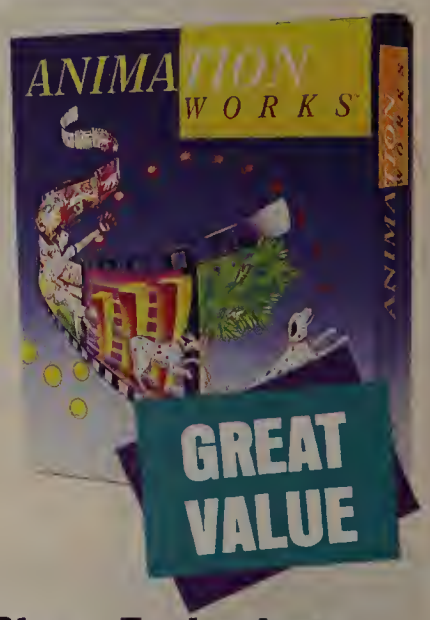
$749 MacroMind Director 3.0 is the multimedia presentation and animation tool that helps you communicate with greater impact. It's faster and easier for users to get professional results. Movies and presentations sound, look and play better. #00839

MacroMind MediaMaker

$495 MediaMaker edits and assembles video, and synchronizes it with graphics, sound and animation. The Collection & Sequence modules make the process much easier. #03851

GoldDisk Software Animation Works

$122 This is a fantastically creative program allowing the easy way to animate, create and present. An animation package that allows you to combine graphics, text and sound into colorful, high-impact movies! Ideal for education and sales presentations, simulations, storyboard, video titling and video production. Comes with FREE instructional video. #03974



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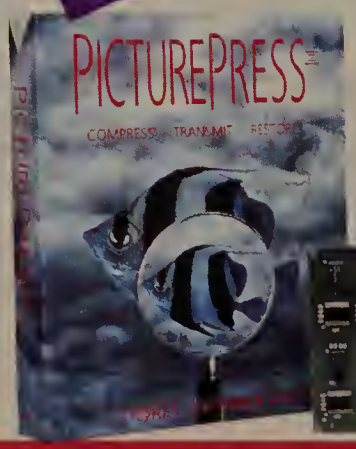
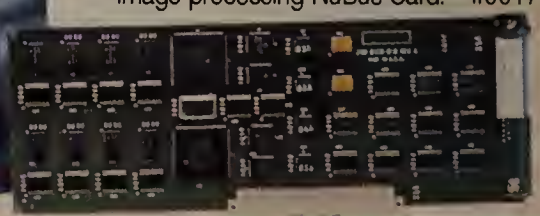
Storm Technology PicturePress

$653 PicturePress compresses and decompresses 24-bit color images 10 to 30 times, using the emerging Joint Photographic Experts Group International Still Image compression standard. PicturePress operates alone or can be accelerated 2 to 100 times by the PicturePress Accelerator Card, a programmable 60 MIPS image processing NuBus Card. #00179





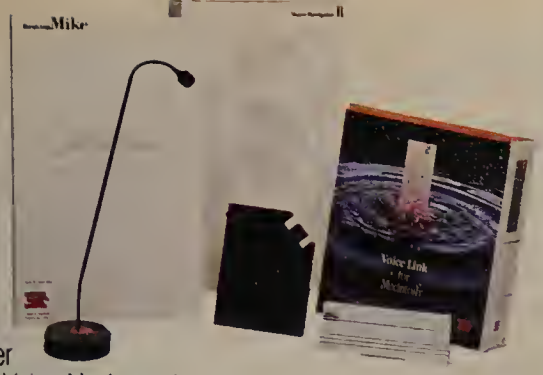
MULTIMEDIA

4

MOST PRODUCTS SYSTEM 7 COMPATIBLE

Articulate Systems Voice Navigator II

$570



Just speak to your computer and it will do what you say! Voice Navigator II allows you to control your Mac by speaking to it. It is compatible with all Mac software and can run on any Mac. Using state-of-the-art technology, you can use any language, accent or voice to drive your Macintosh faster than you ever thought possible. It also provides the highest quality sound digitizing available for recording voice and music. It's the ultimate productivity tool. #03932

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Farallon MacRecorder

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The MacRecorder Sound System is an audio workshop that lets you record, edit, and play back live or prerecorded sound on your Macintosh. Use the MacRecorder Sound System to enhance your desktop presentations and training materials with voice music. Features a built-in microphone, mike jack, line-in jack, and input level control. #02584

Specular International Infini-D 3D Modeler

$649

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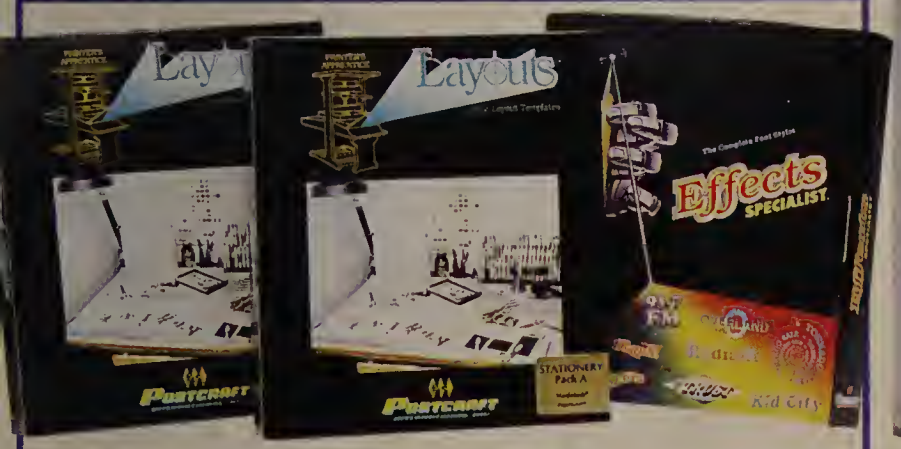

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Letraset ColorStudio 1.5

$598

With ColorStudio, you can retouch, merge, correct, and create color images with the precision and control you've always wanted. It takes full advantage of Apple's new 32-bit Color Quickdraw software (though you'll need a video card and monitor capable of displaying 32-bit color). Also works in 8-bit mode. Controls colors in both PMS and CMYK systems, and makes four-color separations. The color correction tools work within a selected area, or globally throughout the entire image. #03216

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Aldus FreeHand 3.0

$398

Aldus FreeHand 3.0 combines an elegant interface with exceptional power to give the easiest-to-use tool for creating professional-quality graphics. And its range features makes it the most comprehensive drawing and graphics program you can use-from initial design all the way to color prepress production. Whatever your field, you'll find in Aldus FreeHand 3.0 a unique combination of ease of use, powerful performance, and versatile production features #03947

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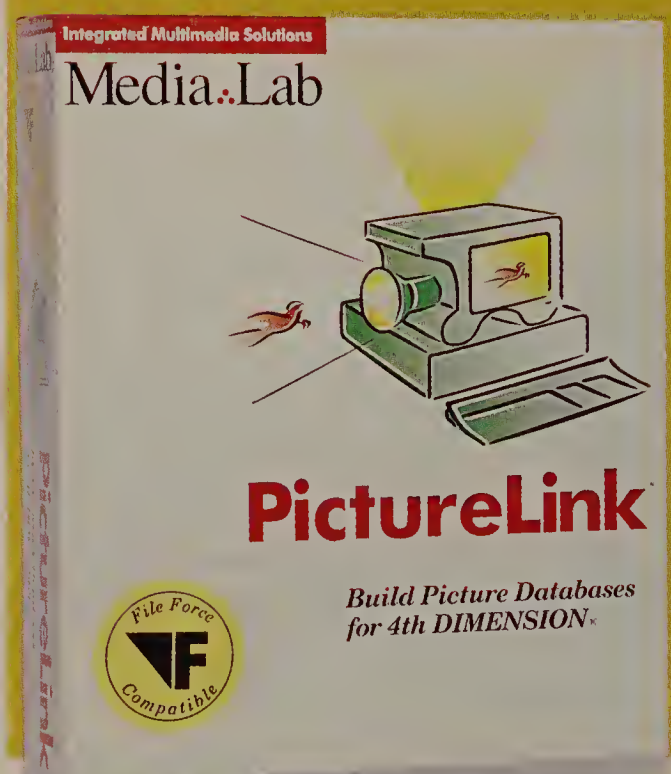
Media Lab PictureLink

$219

PictureLink imports real-world full-color images (photos, artwork, 3D objects, anything) into your database using a variety of methods. Scan into PictureLink directly from black and white or color scanners. Even grab real-world images in real-time from video sources such as cable TV, video cameras, or other instruments. #03774



Silicon Beach Software Digital Darkroom

$258

Digital Darkroom™ is a gray-scale image processing software for retouching, enhancing, composing, and modifying scanned photographs and other bitmapped graphics on the Macintosh®. Digital Darkroom offers desktop publishers, photographers, and graphic artists the software solution to their image processing needs. #03881

Ray Dream JAG

$69

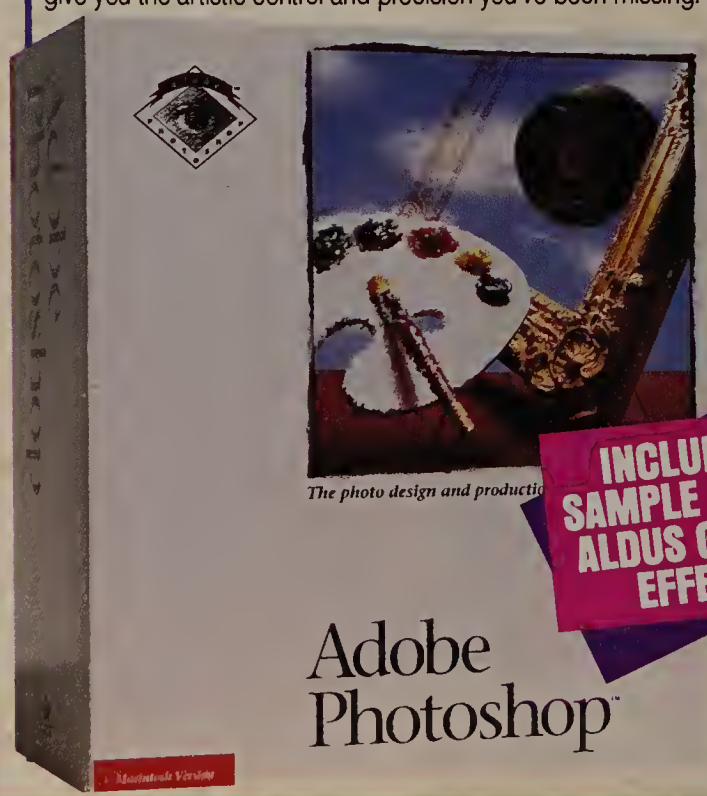
A utility designed to anti-alias 8 and 24 bit still images and animations. By turning off over-sampling based anti-aliasing features in 3D rendering software, JAG can speed up rendering time by 50-400%. JAG works in the background to smooth PICT and PICS files of any size. By removing the jagged edges JAG creates professional quality artwork in seconds. #04150

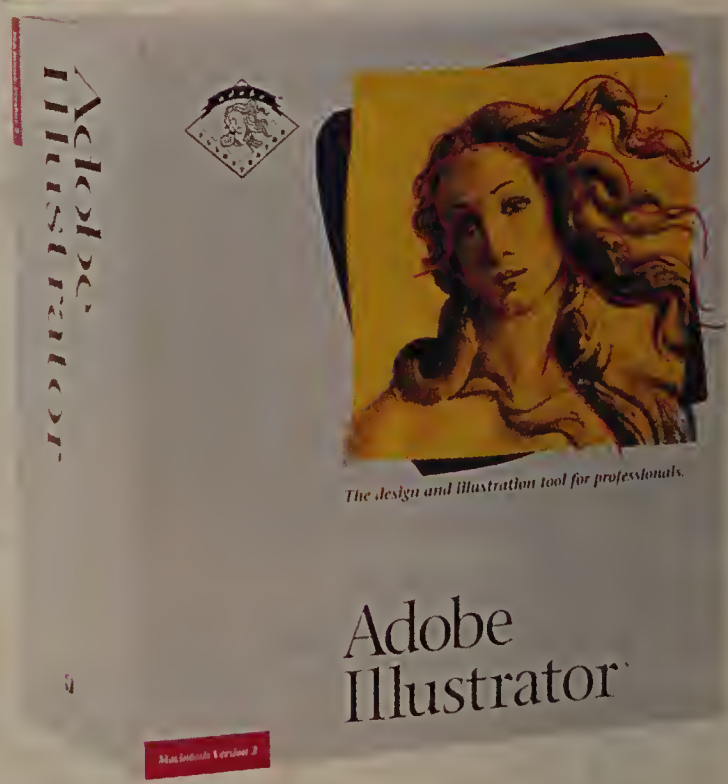
SOFTWARE PRODUCT OF THE YEAR - MacUser

Adobe PhotoShop 2.0

$549

Adobe Photoshop is the affordable Macintosh image-processing program with enough power and versatility to be used as a paint, prepress, color correction and darkroom system. And it does it all in living 24-bit color. Whether you start with scanned photographs, slides or electronic artwork from scratch, Adobe PhotoShop's full range of filters, painting, drawing and selection tools give you the artistic control and precision you've been missing. #04042



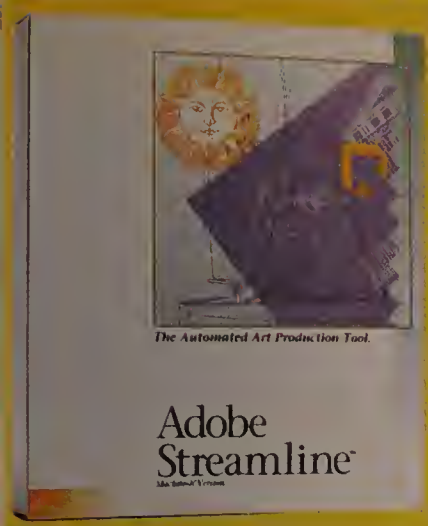


Adobe Illustrator 3.0

$369

You can create PostScript technical illustrations, free form sketches, or even trace scanned images automatically. Improvements in the user interface make using Illustrator easier than ever. The most significant new function allows you to enter and manipulate text directly on the page without working through a dialog box. With the text tool, you can mix typefaces, sizes, styles, and colors in a text block. And, Illustrator gives you control over kerning, tracking, word and letter spacing, plus the ability to place text on a curve. If you need to generate presentation graphics, you'll appreciate the new graph tool. Use it to create the particular type you want (including bar, line, area, scatter and pie), then use all the Illustrator tools to customize it for your particular needs. Once you create a style, you can re-use it with different data. #03558

CALL FOR EVERYDAY LOW PRICES.



Streamline

$118 Streamline is a free-standing autotrace application derived from Illustrator 88. It works in either Outline or Centerline mode, or a combination of both. The Centerline mode traces lines down the center, not around the edges. Streamline can read TIFF files from scanners, along with PICT and MacPaint files. Streamline can output to an EPS file for either Macintosh or PC compatibles. #03971

Letraset Font Studio

$368 FontStudio solves the problems of creating distinctive type for headlines, ads, special symbols, and product logos. Design your own unique fonts from scratch, or modify existing fonts to fit your needs. #03218

Letraset Design Studio

$488 Choose the working method you prefer—guidelines, grids or free style. Then, use DesignStudio tools (rotation, grouping auto frames, rule borders, arrows and pen patterns). Includes text rotation in one degree increments, shared text, tracing kerning, fractional point sizes, and auto runaround. Includes full function word processor and spelling checker. #03217

ESSENTIAL TYPE TOOLS

Pantone, Inc. Process Color System Guide

When you need a much broader selection of process colors, turn to the PANTONE Process Color System Guide. This fan-out process color selector provides users with a visual color standard and screen precentage values for over 3,000 new CMYK combinations which are easily created, specified and reproduced with your favorite graphics, program. #04056

YOUR CHOICE $44

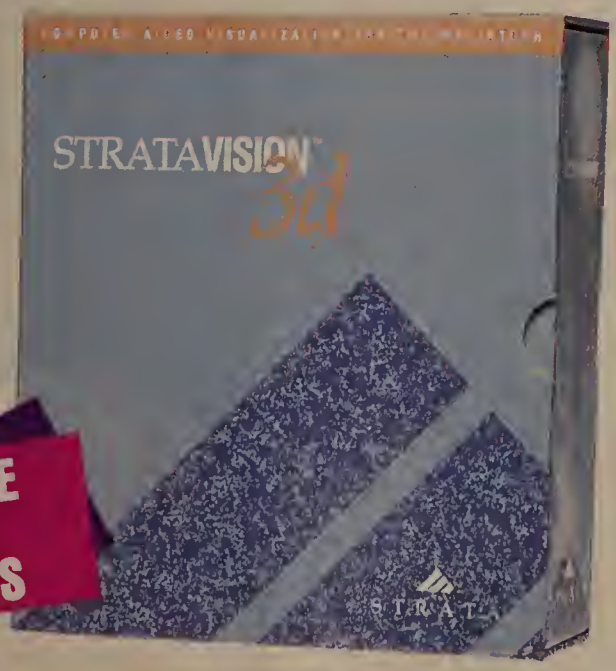
Process Color Imaging Guide

The PANTONE Process Color Imaging guide is the perfect companion to all Pantone-licensed software Programs. It provides a visual comparison of solid PANTONE Color and process simulations as they would appear on the final printed piece. As many PANTONE Colors cannot be satisfactorily reproduced in four-color process, this publication provides the user with the information to best decide whether to specify spot or process color while working on the desktop. #03435

SYSTEM 7 COMPATIBLE

Strata, Inc. StrataVision 3D 2.0

$515 Create scenes complete with props, lights, shadows, textures and reflections. Includes powerful, yet easy-to-use modeling tools. Import 3D and 2D objects from other programs. Create 3D text and logos easily. New animation capabilities include linked objects, hierarchical paths, and geometric and surface metamorphosis. Use StrataVision 3D's powerful raytracer to create the most photorealistic images possible. StrataVision 3D is compatible with System 7.0 and System 6.0.3+. #04088



CREATE 3D LOGOS

Paracomp Swivel 3D

$294 Swivel 3D is a three-dimensional color drawing/modeling program. It is intended for graphic artists, engineers and designers to create complex models for use in presentations, desktop publishing and schematic designs. Features include: a linked database with constraints that allow a user to lock the objects' relative movement and orientation, Z buffering, which solves object intersections and a full range of rendering commands, such as shadowing, projecting images and setting light sources. #02650

PACKED WITH FEATURES

Dynaware DynaPerspective 2.0

$599 DynaPerspective is a three-dimensional modeling and design presentation program that can stand alone or enhance other CAD systems with its innovations and unique features. Highly flexible geometric primitives allow rapid creation of design, assigning such attributes as color, transparency, line type, border display, etc., which can be edited at any stage of the construction. #03761

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Established 1986

Delta Tao Monet

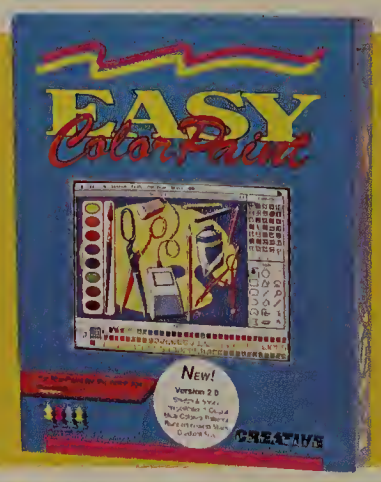
$249 A totally new type of graphics application. Monet lets you create stunning impressionist paintings and illustrations. Better and different than anything else. Requires System 7. #04082

Delta Tao Color MacCheese

$64 Color paint that's powerful enough for artists, but so simple and affordable everyone should have it. Does anti-aliasing, transparency, full color patterns, transmogrification, and more. #04070

Creative Software Easy Color Paint 2.0

$44 Easy Color Paint 2.0 will bring many colorful and fun-filled hours to your Macintosh LC or any Macintosh II. It's suitable for any user skill level: window locking for beginners, fancy menu options and pressure-sensitive pen for pros. #03862



Deneba Canvas 3.0

$299 This new version delivers more than one hundred new features including significantly enhanced text handling, object blending, Bezier font outlines, and full support for Deneba's revolutionary Open Architecture technology. #00803

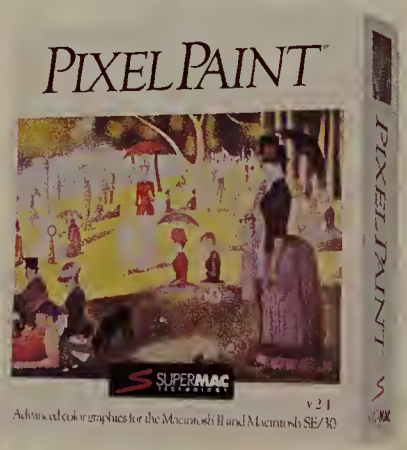
SUPERMAC TECHNOLOGY

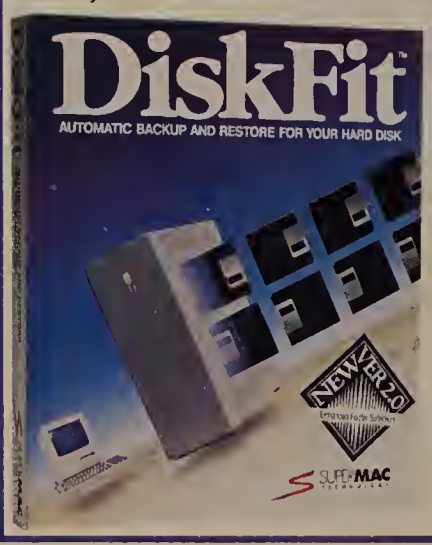
Pixel Paint Pro 2.0

$458 PixelPaint Professional is the first application specifically written to take advantage of Apple's new 32-bit QuickDraw software. It includes all the features of PixelPaint 2.0 like the PMS color selection, dithering and the ability to make color separations. #02665

Pixel Paint 2.1

$148 Use lines, arcs, polygons, splines and fracted lines to create freehand shapes. Or choose airbrush, line drawing, oil painting or water color palettes to create artwork in any style. Use smearing, blending, smoothing, washing and shading techniques with any tool. #01576





SuperMac Technology DiskFit 2.0

$57 DiskFit is a hand utility for backing up your hard disk on a series of floppies. DiskFit saves time. It backs up only those files which have changed since the last backup. It can verify each floppy after copying files onto it, so you know your files are safe. DiskFit also discards old versions. #01138

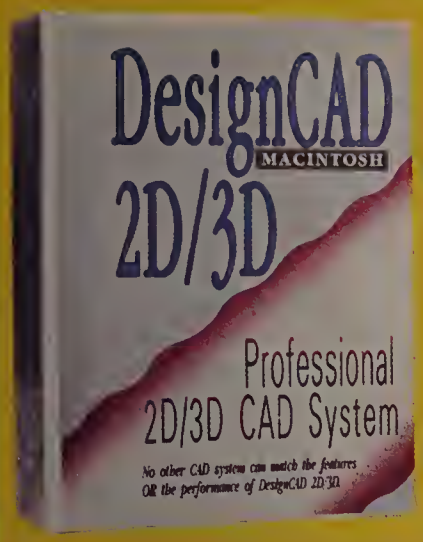
Abracadata Design You Own Home

Whether you're a novice or professional, you can now design your own home with these three programs: Architecture, Interiors and Landscape. Architectural Design enables you to draw floor plans, side view building plans and structural details in a fraction of the time it takes to draw by hand. With Interior Design you can arrange furnishings in your floor plan, explore color schemes and make changes often and easily. Use Landscape Design to create full-color plans for your property by experimenting with flowers, shrubs, trees, walkways, steps, fences amd more. All includes dozens of sample plans.

#03609 Design Architecture
#03610 Design Landscape #03611 Design Interiors

YOUR CHOICE $64

NOW OPEN 24 HOURS A DAY - EVERYDAY



DesignCAD 2D/3D 3.0

$437

DesignCAD is a revolutionary and professional computer-aided design and drafting package that provides complete 2D drafting and 3D modeling in one package. Use your designs for Engineering (mechanical, architectural & electrical) Animation, Desktop Publishing, and Multimedia. DesignCAD provides the speed and accuracy necessary to manipulate complex two- and three-dimensional designs. File support for DXF, IGES, XYZ, PICT, RIB (MacRenderman). #04180

Innovative Data Design MacDraft 2.1

$278

A classic precision drawing and drafting program for engineering design and drafting and technical illustration. MacDraft now features a moveable geometric drawing tool palette, support for PostScript output, layers (limited only by memory), on-line symbol libraries, 44 different scales, dimension lines, Bezier and spline curves, automatic area calculation, full Macintosh color support and more! Reads TIFF (scanned images) and MacDraw® II files. All this, combined with incredible ease of use, makes MacDraft the most powerful, low-cost solution to your drawing and drafting needs. Runs on any MacPlus or higher with System 6.0.2 or later. System 7.0 compatible. #00429

GraphSoft MINI CAD 3.1

$585

MiniCad+ is a product that integrates a spreadsheet and a relational database into a drawing so you can keep track of costs as the design evolves. Database information linked to a particular object stays with that object even when it is cut and pasted into another drawing. MiniCad+ also has a built-in programming language and a "smart cursor" to aid in the finer points of drafting. #03540

A 'MUST HAVE' FOR ARCHITECTS & ENGINEERS

Innovative Data Design Dreams

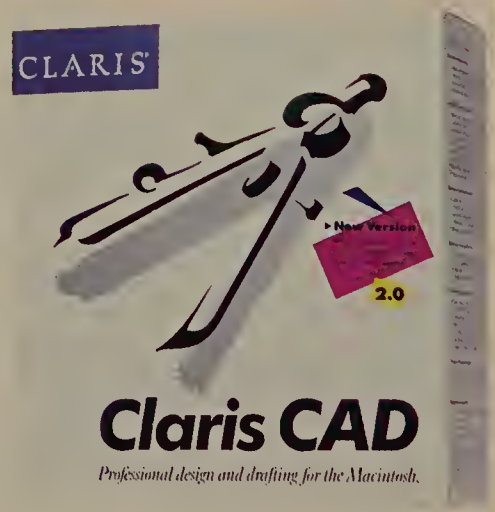
$409

An excellent, cost-effective choice for advanced architectural and engineering design and drafting. Dreams provides standard drawing tools as well as these expanded drawing capabilities: parallel line tool with merging of intersections, 15 customizable line styles, extend lines to intersection (or a reference line), glue and unglue (glue edges together/unglue objects into component edges), add and subtract objects to or from one another, trim tool, fillet tool, true associative dimensioning (automatically updates when an object is resized), optional keyboard editing for precise resizing or moving. Runs on any MacPlus or higher with System 6.0.2 or later. System 7.0 compatible. #02015

Claris CAD 2.0

$644

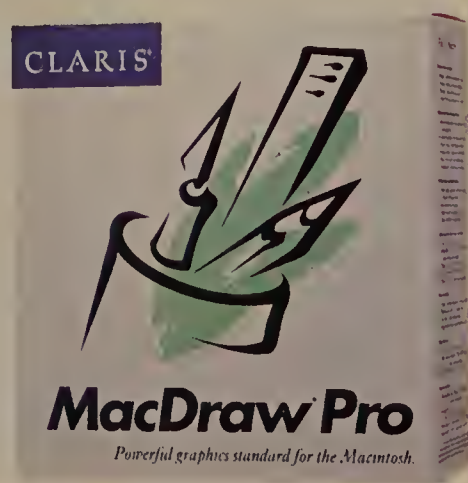
Claris CAD is the professional design and drafting tool for engineers and architects. It integrates a wealth of two-dimensional design and drafting features, including mouse/keyboard entry, construction of fillets, tangents and perpendiculars and automatic dimensioning, while fully utilizing the Macintosh interface. Version 2.0 includes a new interface Graphic guide, which intelligently guides you, anticipating the next steps and locating and indicating key geometric points on screen. #03693



Claris MacDraw Pro

$279

The powerful graphics standard for the Macintosh! Tear-off palettes allow access to a variety of innovative and time-saving features. Features include a flexible style bar, powerful gradient fills, new precision zoom tool. Now you can design at over 2300 dpi. #04073



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Uncle Milty's ClipArt Collection

$34 Use Uncle Milty's Clip Art and your newsletters, ads, flyers, invitations, brochures, memos, etc. will be more inviting, pleasant and fun to read! One hundred illustrations on three disks, hand-drawn by Uncle Milty & Friends! Use with Pagemaker®, Quark Express®, and other popular page layout programs that import TIFF! #04273

Online Arts ClipArt Business Images

$79 Business Images includes over 160 high quality, ready to use PostScript clip art graphics. You can have professional quality artwork to enhance your business publications, newsletters, brochures, advertisements, memos or any printed piece. This package includes images most requested from professional artists including: people, computers, equipment, symbols, hands, phrases, backgrounds, and much more. #00178

The Professional's Choice In EPS Clip Art

Dream Maker Software

Outstanding artwork at only pennies per drawing! Each Cliptures volume gives you a wealth of: Dynamic illustrations perfect for all kinds of projects; Versatile, ready-to-use artwork that's faster and easier than creating your own graphics from scratch; High resolution EPS images that look great even when they're enlarged, reduced, or stretched. Cliptures works with any software program that accepts EPS (Encapsulated PostScript) fields. A PostScript compatible printer or interpreter program is recommended for the best results.

Volume 1: Business Images

Gives you 148 terrific business illustrations including a wide selection of male and female executives and a variety of tantalizing business cartoons, graphics and symbols. #03998

Volume 3: Sports

Puts 228 fantastic sports images at your fingertips. Includes lots of men and women athletes and a rich collection of other outstanding sports graphics, symbols and icons and more. #04000

Volume 4: World Flags

Contains exquisitely detailed national and civil flag illustrations from all the independent and dependent countries of the world, plus various international organization and code flags. #04282

Volume 2: Business Images 2

Adds another 206 powerful business illustrations of men and women at work, plus people silhouettes, business cartoons, aircraft, money, telephones and lots of computers. #03999

YOUR CHOICE $67

Dream Maker MacGallery

$26

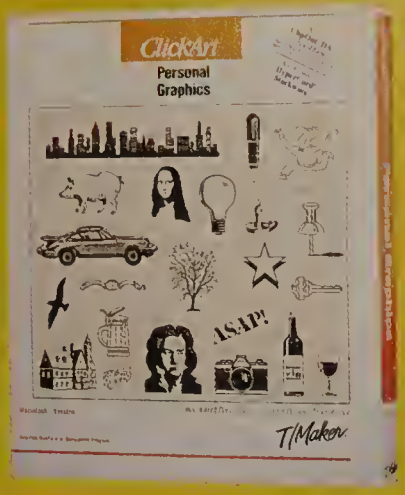
You'll enjoy using this light-hearted collection of well over 400 hand drawn images. Use MacGallery with any PAINT program or with HyperCard. Excellent clip art for ImageWriter users!

Puts fun in your work!

- Great looking images
- Easy to use
- Easy to change
- Best variety for price
- Perfect for all kinds of projects

#03996

EDUCATIONAL & INSTITUTIONAL PURCHASE ORDERS (ACCEPTED UPON CREDIT APPROVAL)



T/Maker ClickArt

ClickArt® is a high-quality, ready-to-use artwork that adds pizazz to newsletters, flyers, brochures, advertisements, memos, presentation materials, and more. The ClickArt collection contains more than 3,000 images in 13 portfolios, covering a wide variety of subject areas. ClickArt images work with virtually all desktop publishing, word processing and presentation software products.

EPS Portfolios:

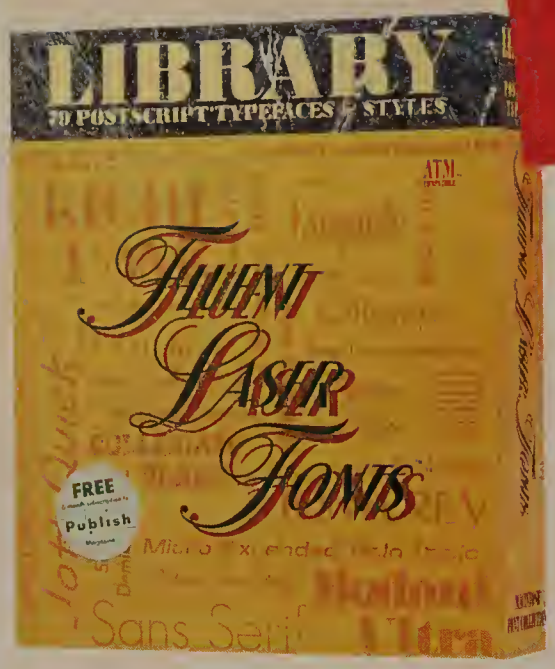
- Business Art
- Illustrations
- Animals & Nature
- Sports & Games
- Symbols & Industry, Vol. 1

Your Choice $82

Bitmapped Portfolios:

- Business Cartoons
- Business Images
- Christian Images
- Events & Holiday Cartoons
- Holidays
- Personal Graphics
- Publications

Your Choice $31



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Casady & Greene Fluent Laser Font Library 4.0

$79

The library includes 79 PostScript typefaces and 79 truetype faces. John Dvorak once recommended these fonts for an Eddy award! The purchaser is entitled to a 6-month free subscription to Publish Magazine. No one else has this kind of variety and style at such an affordable price. (This collection previously sold separately in 21 volumes for $89.95 per volume.) #00315

MORE FONTS FOR YOUR MONEY

Bitstream Font Pack 3

$98 The Bitstream Font Pack 3 includes four styles each of Zapf Humanist and Baskerville. Use these to make text enticing and easy to read. You also get five decorative fonts that add flair and flash to your words. Use these for signs, flyers and invitation. #04010

Bitstream Font Pack 4

$98 The Bitstream Font Pack 4 includes four styles each of Incised 901 and Goudy Old Style. Use these to make text enticing and easy to read. You also get five decorative fonts that add flair and flash to your words. Use these for signs, flyers, and invitations. #04011

Versatile New Art for Industry, Healthcare, Sports & MORE!

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3G GRAPHICS IMAGES WITH Impact!

EPS FORMAT

PEOPLE 1

If you're looking for superbly drawn ethnic women and men in diverse occupations and livelihoods, then 3G's latest offering is ideal for you. You'll get up to **1,000 graphics** by ungrouping and separating them in compatible draw programs. Categories include: **Business** (some humorous), **Industry** (with 75 occupational symbols), **Healthcare** (hospital and clinical settings), **Fitness, Sports** and **Arts & Entertainment.**

#00421 **$99**

Award-Winning Art at Your Fingertips!

1990 WINNER MacUser

BEST DATA RESOURCE

ACCENTS & BORDERS 1

Creative borders, designer sets, labels, symbols of food, holidays, people and more.

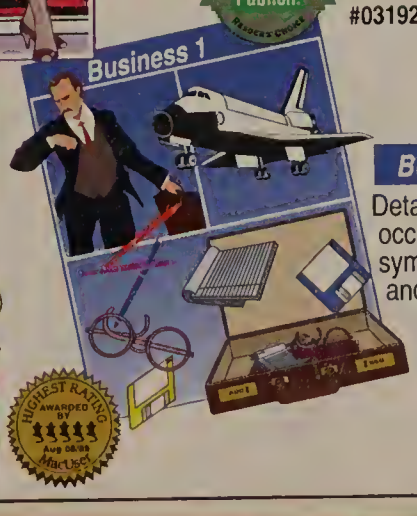
Registered users receive a FREE color disk!

#03192 **$64**

GRAPHICS & SYMBOLS 1

Useful topics include people, cartoons, food, travel, symbols and frames.

#01617 **$55**



BUSINESS 1

Detailed art of computers, occupational and public symbols, people, phrases and more. #02085

$64

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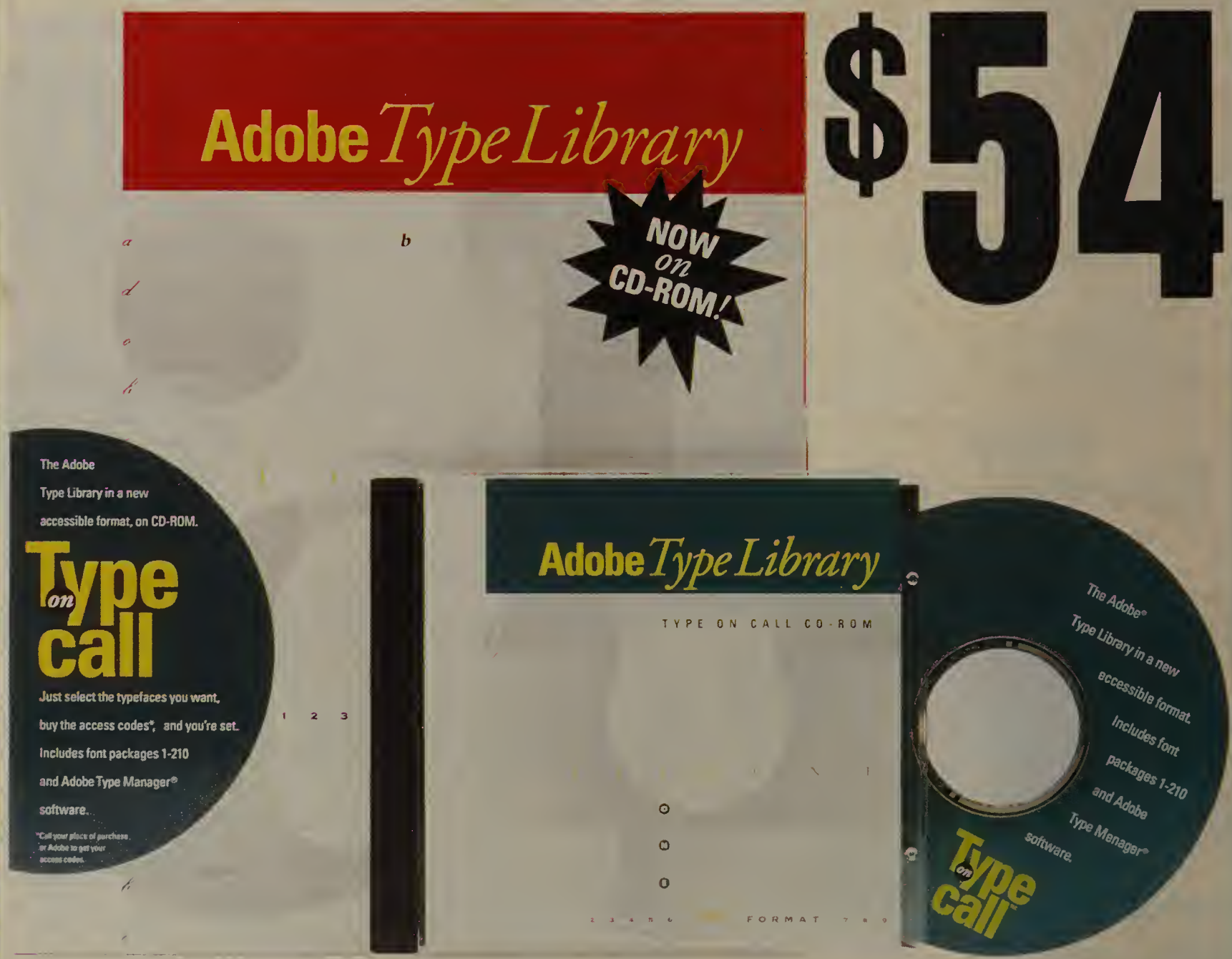
THE MOST AUTOMATIC, AFFORDABLE WAY TO SELECT TYPEFACES

Adobe Type On Call



Adobe has just put software for the world's largest selection of high-quality digital typefaces on a single compact disc. It's named Type On Call and it's the most automatic, affordable way to select any Adobe® typefaces you need— anytime you need them. Every Type On Call disc includes Adobe Type Manager® (the program that removes the jagged text from your Macintosh screen and ImageWriter® output) along with all 13 ATM® fonts and two Adobe font packages of your choice.

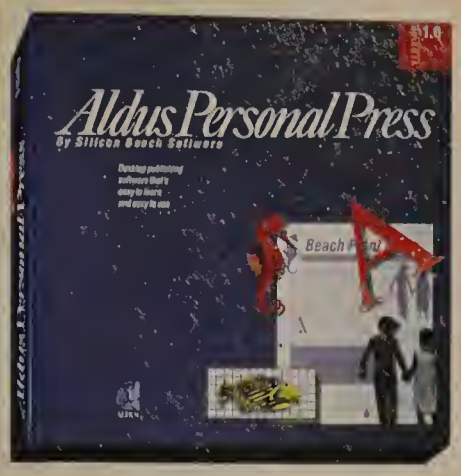
But it's also just the beginning. Since your Type On Call disc contains software for every typeface from packages 1-210 in the Adobe Type Library, just pick up the phone and tell us which packages or single typefaces you need. Then, after telling you how to unlock the fonts you've ordered, we will simply charge your credit card. That's all it takes. Best of all, you'll be offered all kinds of specially priced type sets and money-saving deals on a regular basis. So call now for all the details. Because square deals like this don't come around very often. #03950

INTERNATIONAL ORDERS ACCEPTED — NO SURCHARGE

WYSIWYG PACKAGE

Frame Technology FrameMaker 3.0

$594 FrameMaker is a powerful, WYSIWYG publishing package desinged for creating professional-looking business and technical documents of any length. It combines full-featured word processing, graphics, page layout, equations, editing and book building tools into one integrated package. Features include: publication-quality typography, font sizes from 4 to 400 points, mixed page orientations, zoom capability, cross referencing and footnotes, FrameMath equation editor, spot color separation, spell checking and hyphenation control. #03582



Aldus Personal Press

$198 Personal Press is for people who want the power of publishing with a minimum investment of time and money. A page layout program with a full-featured word processor and powerful graphics capabilities, Personal Press includes all the features you need for nearly any desktop publishing task, from simple flyers and letters to slick newsletters and brochures. Helpful visual previews, on-line help, and the automation of key tasks streamline your layout process and provide an environment that is easy to learn and use. #03880

OUTSTANDING GRAPHICS PROGRAM

Quark XPress 3.0

$518 XPress 3.0 boasts a more intuitive user interface, many new features, plus redesigned and reorganized documentation. New measurement and page palettes provide the user with interactive on screen access. A library stores frequently-used items and a pasteboard provides a work area next to each page. You can group text and graphics as single elements and rotate them a full 360 degrees in 0.001 degree increments. Color trapping ensures precise color printing. #03488

Aldus PageMaker V. 4.01

$498

NEWEST VERSION

PageMaker 4.0 goes beyond the paste-board metaphor that made the original PageMaker a smash hit. New features include a blindingly fast Story Editor, extended support for color, the ability to rotate text, a built-in dictionary and a spell checker. Files can have up to 9999 pages in length and multiple files can share a common index. Special "Hot Links" can be established between PageMaker Document and the graphics and data files they contain, so that updates in the attached files are automatically imported into the PageMaker document. You also get much more sophisticated type control, including the ability to adjust the look with pont-sized dependent kerning on any text in increments of .01 point and a condense/expand range of 5% to 250%. PageMaker can import color graphic images stored in TIFF and EPS format and can use PANTONE, RGB, HLS, or CMYK color models to create color separations with Aldus PrePrint. #03223

AMAZINGLY EASY

Broderbund The Print Shop

$34 The Print Shop makes it amazingly easy to create eye-catching stationery, greeting cards, letterheads, flyers, banners and other presonalized communications. The program includes a wide vareity of type styles, borders, background patterns, pictures and symbols. You can even pick up graphics that were created in MacPaint and transport them to your Print Shop designs. #01015

Timeworks Publish It! Easy with File-It!

$143 Publish It! *Easy* is the all-in-one desktop publisher that combines page layout, word processing (complete wtth thesaurus and spell-checker), built-in drawing and painting tools and a slide-show in a simple, easy-to-use package. Now with File It!, an advanced data base and mail merge program built right into Publish It! *Easy*. That means you do not have to leave *Easy* to create a database, to customize a document or form letter complete with personalized information or to select, sort, edit or change your data. #03798

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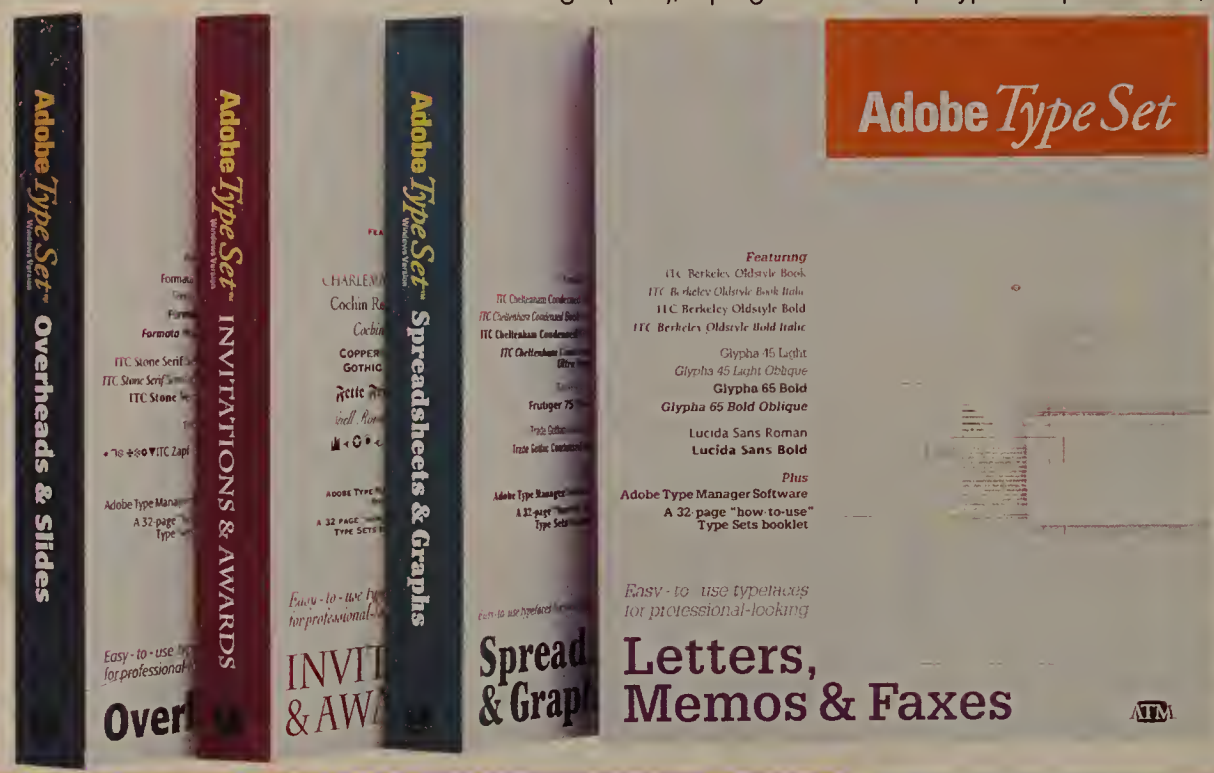
The Mac Zone
Established 1986

Adobe Type Set for Business

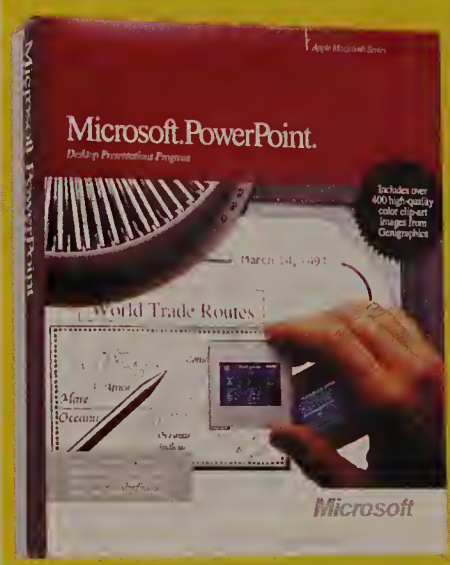
The new Adobe Type Set for Business packages are special collections of typefaces chosen specially for a variety of popular business applications. The four packages include Letters, Memos & Faxes, Overheads & Slides, Invitations & Awards, and Spreadsheets & Graphs. Available in both Macintosh and Windows versions, each package contains eight to ten typefaces and the award-winning Adobe Type Manager (ATM), a program that keeps type sharp and clear, at any point size, onscreen or on paper. Also included is a helpful 32-page booklet that shows how to use the typefaces most effectively, allowing even novices to create professional-looking business communications right from the start.



$94 each

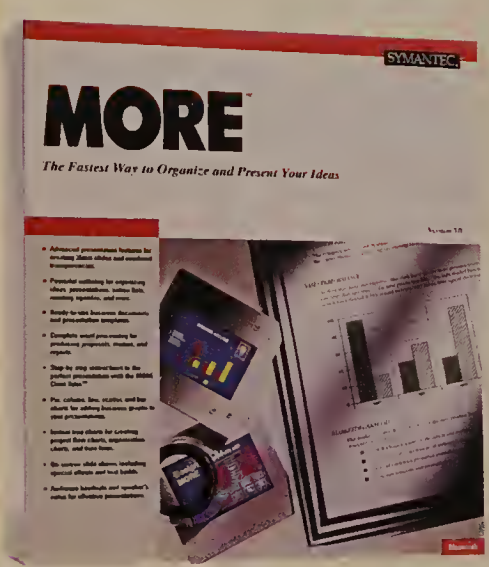
#04211 Type Set 1
#04212 Type Set 2
#04213 Type Set 3

NEW



Microsoft PowerPoint 2.01

$244 Presenting Microsoft PowerPoint for the Macintosh. PowerPoint comes with WYSIWYG technology - create slides or overheads directly on screen. Use the built-in graphing tool to create business charts. A new breed of desktop presentations software that lets you create the most unforgettable presentations you - or they - will ever see. #01220



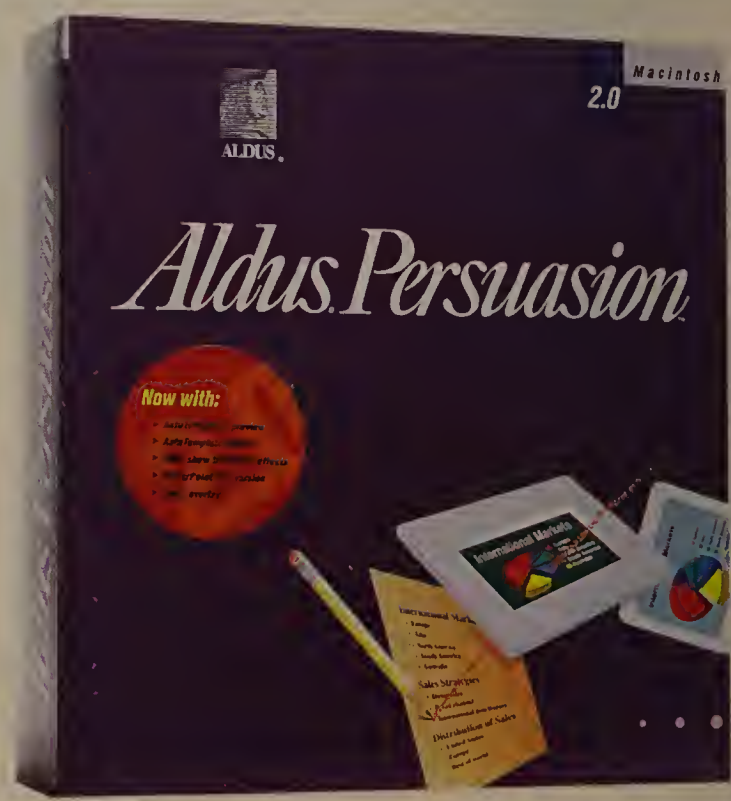
Symantec More 3.0

$264 Use More 3.0 to organize and prepare your next presentation. It will even run your slide show for you. You can start by typing your thoughts into the Outliner, and then let More help you organize them when your ideas start to gel. With More, it's easy to import clip art to illustrate your point, or you can create your own with More's drawing tools. Add some of More's dazzling charts and graphs to bring your data to life. When you're finished, More will print out overhead transparencies, 35mm slides (overnight through Autographix Service Centers), and professional looking audience handouts. #02007

DEVELOP PROFESSIONAL LOOKING PRESENTATIONS

Aldus Persuasion 2.0

$328 Let Aldus Persuasion 2.0 do all the work of developing presentation graphics. Select one of the predefined templates (or create your own), and type your ideas into the outliner, Persuasion automatically prepares your slides from the outline. Version 2.0 has a larger template library, and its AutoTemplate function enables you to preview, combine, or change template designs at will. Persuasion provides a variety of predefined charts and graphs (or you can create your own). It automatically generates speakers' notes and handouts. You can use the slide show mode (with 15 different wipe and dissolve effects) for your presentation, or for a self-tuning demo. Persuasion includes drivers for the most popular printer and film recorders. #02424

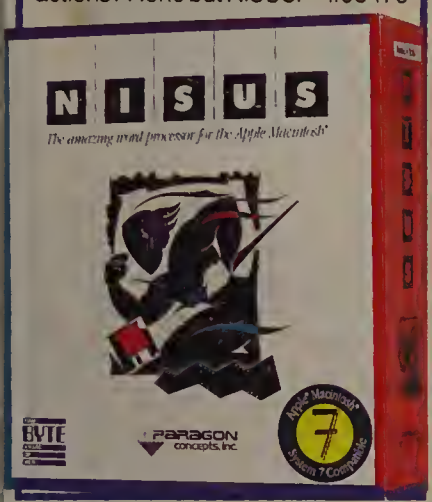


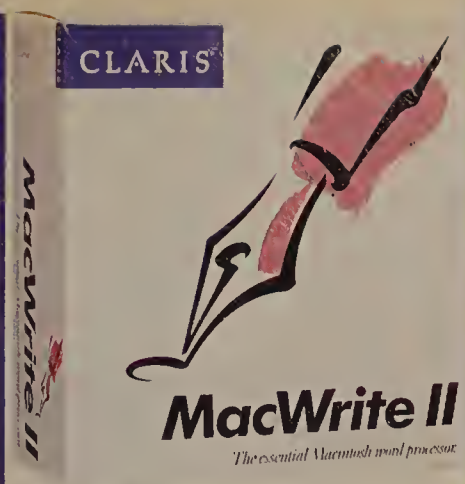
OVER 2000 MACINTOSH PRODUCTS IN STOCK.

FEATURE PACKED

Paragon Concepts Nisus

$244 The breakthrough is here. There is no other word processor on the market as powerful, fast or easy to use as NISUS. Which one, at the click of the mouse: Lets you draw a picture right over the text? Makes it transparent or opaque? Lets text flow through or instantly wrap around it? Searches through unopened files formats database output? Allows you to undo more than 32,000 text or graphic actions? None but NISUS. #03479





MacWrite II

$138

Create a variety of documents. MacWrite II® software gives you all the tools you need for a wide range of writing tasks, from simple memos and reports to sophisticated business proposals, multi-column newsletters, and 1,000 page manuscripts. Check your spelling with the built-in 100,000-word dictionary. Or find just the right word with the 220,000-word, desk-accessory thesaurus. Read, edit or insert files created in other word processors like MS Word or WriteNow. Open a file in MacWrite II and start typing— then save it back to its original format. #02485

Microsoft Word 4.0

$244

The Mac Zone — Established 1986

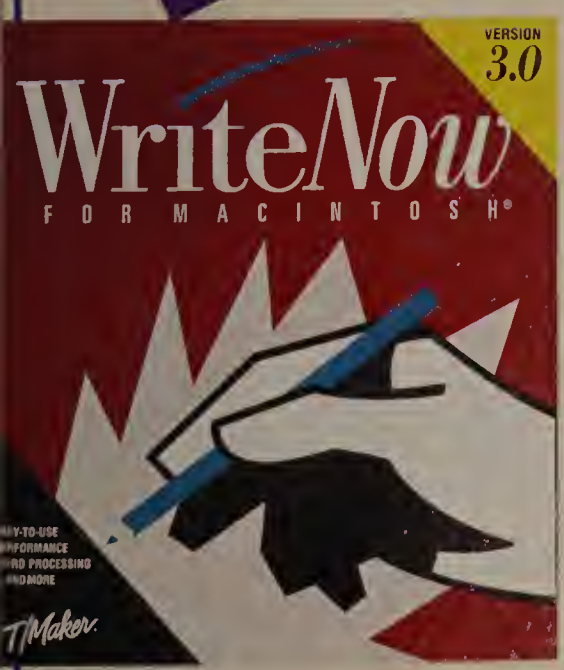
Design pages with different numbers of columns on the same page. Place sidebars exactly where you want them. Automatically wrap text around graphics. Tables are a breeze. Just enter the number of rows and columns you need and Word generates your table with automatic text wrap within cells. Word 4.0 even has facilities for creating mathematical formulas. It has a spelling checker, hyphenation, style sheets, a glossary, automatic indexing, mailmerge and an integrated outliner. Coupled with a connectivity program such as MacLink, Word 4.0 on the Mac is compatible with the MS-DOS version of Word and with PageMaker (both Mac and PC versions) so you can exchange files among all these formats. #02238

MACUSER EDDY AWARD WINNER

SYSTEM 7 COMPATIBLE

T/Maker WriteNow 3.0

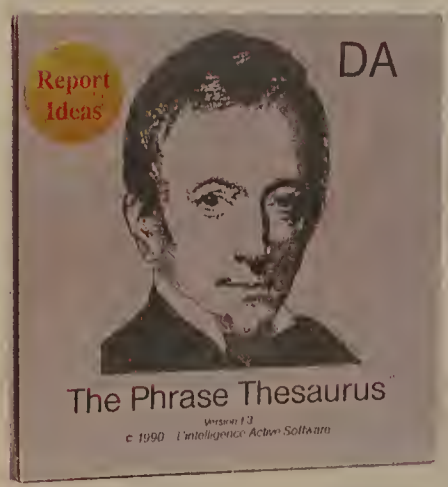
$116



Who says a professional word processor has to be slow and complicated? WriteNow is the fastest Macintosh word processor and has long been considered by industry experts to be the easiest to use. WriteNow 3.0, boosting the power and performance of its MacUser Eddy-award winning predecessors, includes a lightning-fast 135,000-word spelling checker, a 1.4 million-word thesaurus DA, the most powerful paragraph & character style sheets of any Mac word processor, a robust print preview, compatibility with System 7, Microsoft Word and Works, MacWrite II, PC WordPerfect and much more! #02052

WordPerfect 2.01

$278 With cross-platform support, it has features such as on-screen columns, text boxes, styles, borders, graphics drawing/editing, macros/editor, sort, merge, table of contents/index generation, table of authorities, line numbering, language support, 115,000 word speller and on line thesaurus. Version 2.0 imports and exports MacWrite and RFT documents, also WordPerfect documents that were created on platforms such as VAX, Unix, Data General, NeXT and IBM PC. #03972



IA Software Report Ideas DA

$78 NEW

Expressing good ideas couldn't be any easier with Report Ideas DA. Report Ideas is a unique type of thesaurus and outliner which seamlessly integrates a thesaurus of 140,000 phrases into the established organization patterns of reports and proposals. It handles everything from the smallest memo to the largest proposal smoothly and precisely. Quite simply, Report Ideas gives the writer a better, more intuitive way to create persuasive, hard hitting documents. #04176

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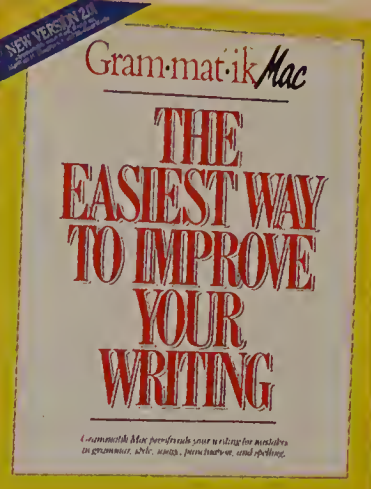
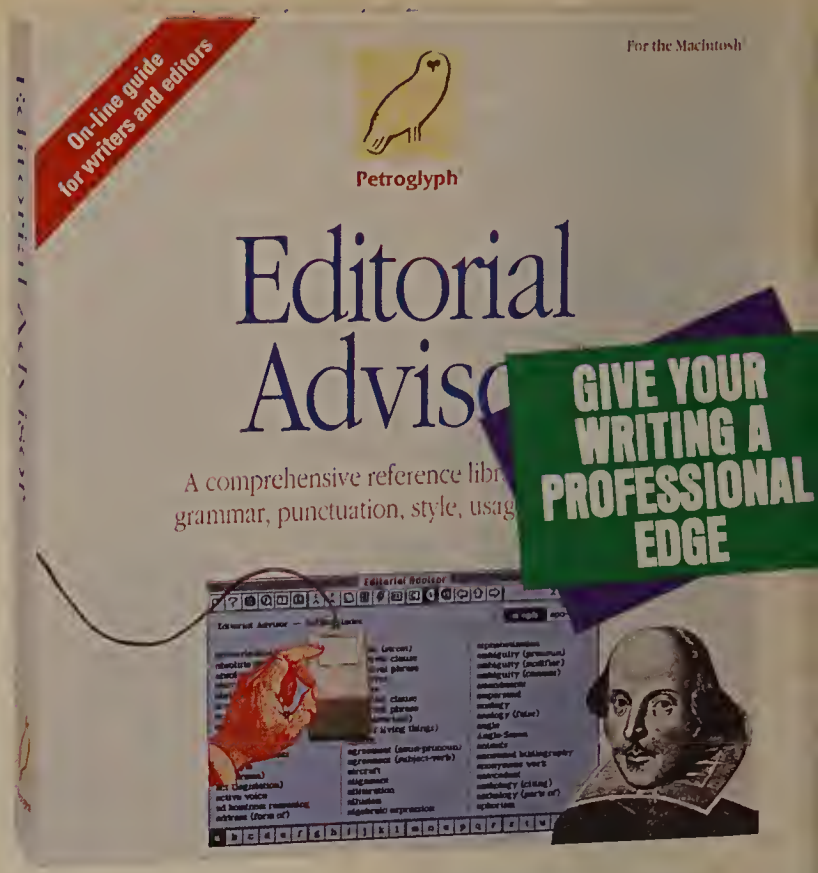
Reference Software's GrammatikMac 2.0



$59 Grammatik Mac improves the qualty and clarity of your writing. It checks for common grammatical and stylistic errors, cliches and jargon, commonly misused words, and long-winded sentences. It also looks for incorrect capitalization, subject/verb disagreement, double negatives, excessive use of passive voice, split infinitives and many other typical writing problems. #03143



A Lasting Impression ResumExpert

$47 ResumExpert makes perfectly formatted resumes every time. These templates for Microsoft Word feature eye-catching layouts that will impress perspective employers. Just select one of the 40+ templates, and substitute the text with your own information. The highly-rated manual provides expert writing tips. Rated 4 mice in MacUser and chosen as one of the top 200 software products of 1989. #03103

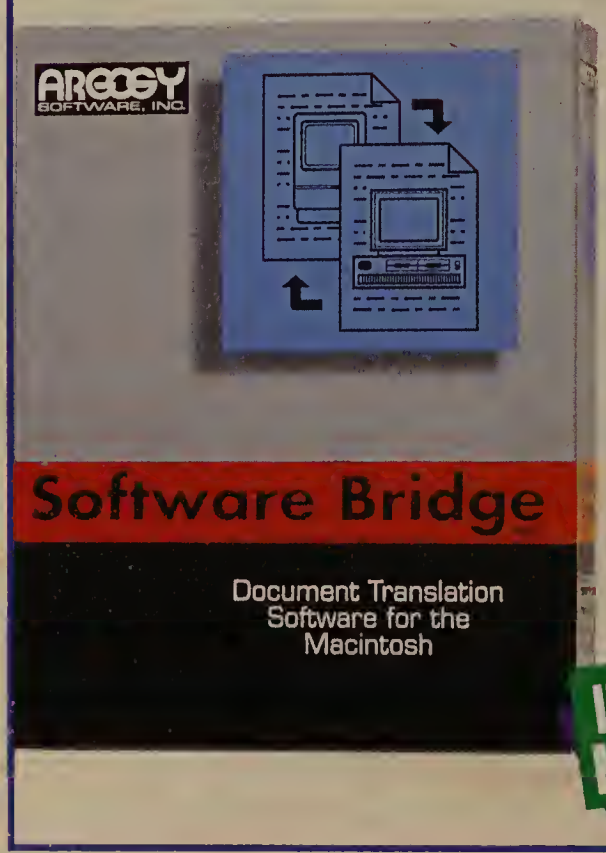
Petroglyph Editorial Advisor

$74 No, it's not a grammar checker. Editorial Advisor is a computerized style manual that covers grammar, punctuation, style, usage and more. Learn the conventions of editing. Give your writing that professional edge. With System 7.0 you can install Editorial Advisor on your DA menu. It's like having a reference library on your hard disk. #03944

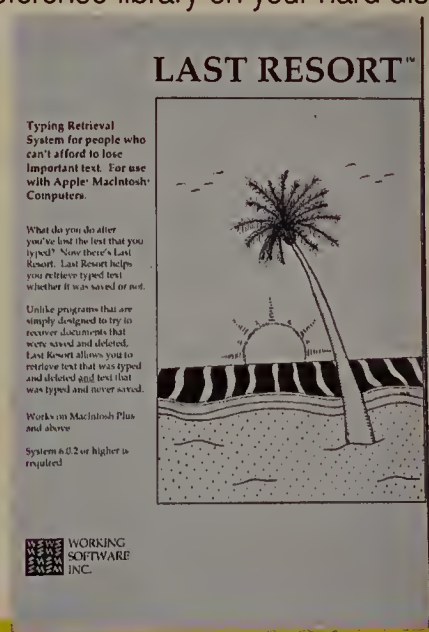
EDIT DOS FILES ON YOUR MAC

Argosy Software Bridge/Mac V. 2.01

$99 Imagine being able to edit DOS documents in your Mac format just by double-clicking them! With SB/Mac you can. Simply double-click on a DOS document and SB/Mac identifies, translates, and launches it into your Mac format, ready to edit. SB/Mac also translates Mac to Mac, Mac to DOS or even DOS to DOS formats (over 30 major word processors are supported). Includes MountPC to access DOS disks from the Mac's SuperDrive like regular Mac disks. "MacLinkPlus' performance was dramatically inferior compared with that of Software Bridge/Mac" (MacUser 3/91). #03194



INCLUDES MOUNT PC



Working Software Last Resort

$28 Last Resort is an all new utility to help you retrieve typing lost by system crashes, failures to save, deletions or other unfortunate circumstances. Last Resort saves every keystroke to a file on your hard disk without slowing your typing. Lost text can be retrieved using any word processor. #04061

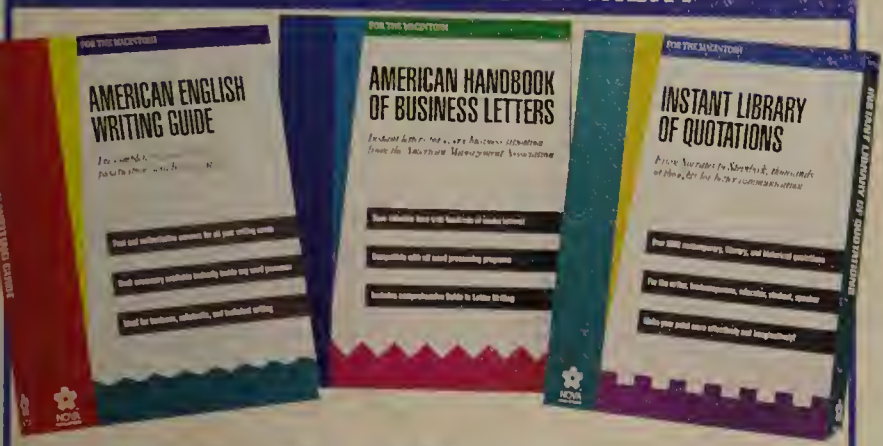
ALL NEW

Bottom Up Carpal Cushion MousePad

$14 Carpal Cushion MousePad is a unique solution for computer users who operate a mouse on a consistent basis. Designed to reduce the risk of contracting carpal tunnel syndrome from repetitive mouse use, the product is thermally formed from a single piece of rubber. It contains a soft vinyl wrist rest to offer maximum support and comfort. Carpal Cushion is currently available in charcol gray. Details on custom orders are available through your MacZone reprensentative. #04305

ORDER BY FAX ANYTIME

SOFTWARE TOOLS FOR BETTER WRITING FROM NOVA DEVELOPMENT



American English Writing Guide

$38 It's the complete reference to style, punctuation, and better writing for the Macintosh. You'll find rules and examples for a variety of writing topics, from capitalization to punctuation, spelling to bibliographies. Make a better impression with your writing with this easy-to-use desk accessory. #04263

Instant Library of Quotations

$32 The Instant Library of Quotations gives you fast access to more than 5000 contemporary, literary, and historical quotations, right from your Macintosh keyboard. Each one can provide a solid foundation for making any point. Whether you write reports, term papers, newsletter articles or speeches, you can add punch to your point quickly and effectively. #04262

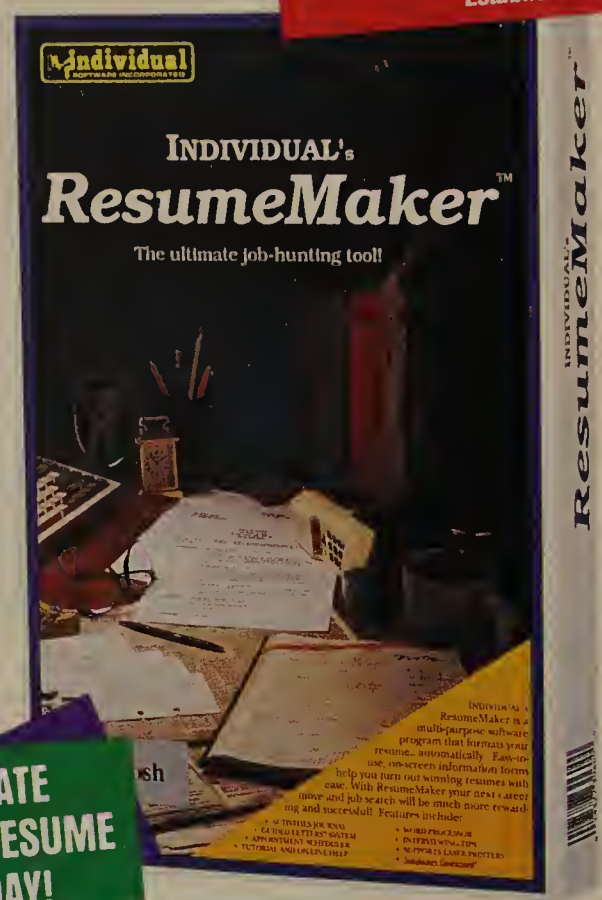
American Handbook of Business Letters

$32 Save time and money with nearly 300 instant letters for every business occasion from the American Management Association from congratulating a business associate to collecting on past-due accounts.Just add a date, name, and address, customize it if you like, and you're ready to print! #04261

Individual Software ResumeMaker

$29

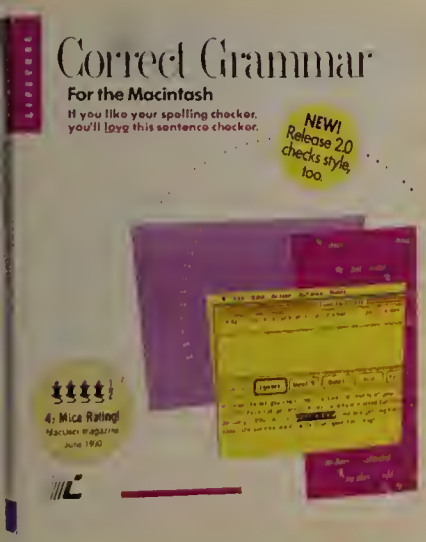
Individual's ResumeMaker helps you quickly get on the right track for the job you want. It's easy to use, simply fill in on-screen information forms with your experience, education and skills. It then automatically transforms this into a winning, professional-looking resume. Includes varied resume formats, Guided Letters, a full word processor, target company database and much more. #00432



UPDATE YOUR RESUME TODAY!

OCR Systems ReadRight™

$329 With ReadRight for Macintosh and a full-page scanner you can easily and efficiently convert paper documents into editable computer text files. Recognizing with an accuracy of 99.9%, ReadRight automatically separates text from graphics and outputs text directly into your word processor, spreadsheet or database. Advanced features include a built-in dictionary, error checker and deferred processing. #00461



Writing Tools Group, Inc. Correct Grammar

$49 Correct Grammar is an easy way to avoid embarrassing mistakes in letters, reports and proposals. It makes your writing clearer and more precise. It identifies inconsistencies in grammar, style, punctuation, usage and spelling (with its own 135,000-word dictionary), and then suggests how you might correct any errors. Best of all, it works so well with all of today's most popular word processing programs that you'll think it's built-in! #03813

Personal Bibliographic Software, Inc. Pro-Cite 2.0

$195 Pro-Cite is a powerful database program that saves you hours of time, energy and frustration by enabling you to manage and format bibliographic and text information automatically. Latest version offers a range of new features and benefits including instant searching, expanded word processing support, and increased record capacity— up to 100,000 records per database. #01892

Biblio-Links

$98 Biblio-Links are companion programs to Pro-Cite. Each program transfers records downloaded from online services, CD-ROM and disk-based data products directly into Pro-Cite. The various bibliographic data elements, such as author, title, and publication date, are automatically transferred into the appropriate fields. #04265

Pro-Search

$149 A specialized front-end software program that simplifies searching of DIALOG databases. Pro-Search's unique, menu-driven interface helps you select the most useful database to search by providing bluesheet data on disk. Save time and money by constructing and storing search strategies offline. A built-in accounting feature tracks online charges automatically. #04266

FAX: 1•206•881•3421

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Established 1986

Dest Personal Scanner With Recognize OCR Software

$685

The first scanner to combine full-page (8.5" wide), handheld scanning and a 10 page automatic document feeder into one desktop unit. Read almost any document into your computer for word processing or desktop publishing applications: letters, books, manuals, technical documents. Even odd-shaped and oversized originals. Personal Scan comes as a kit that includes: 300 dpi resolution, cables and Recongize! #03929

#03930 Recognize Software **$515**

Caere OmniPage 3.0

$499

Reads TIFF files from most scanners, and outputs formatted MacWrite files. It can recognize any nonstylized font from 8-72 points, including typeset, proportionally spaced, and kerned characters. Underlined and bold-faced text translate intact. Knows about multiple columns, and skips over graphics. #04173

Caere Typist

$478

Typist is the personal scanner for Macintosh. It gives you all the raw power of a small typing pool, right on your desktop. Scan rows of numbers directly into your spreadsheet. Scan columns of text directly into your word processor - with the click of a button. The Typist can handle virtually any font, or font size, and enter it directly into your application in whatever format you happen to be using. #03659

GREAT VALUE FOR THE MONEY!

Logitech ScanMan Model 32 and Digital Darkroom

$295

ScanMan and Digital Darkroom together provide a lot of functionality without sacrificing to affordability. In minutes, you can have a picture (black and white or gray) in any of your favorite word processor or page layout software, at a price everyone can afford. #02561

AFFORDABLE PACKAGE

#00513 Logitech Scan Pad **$12**

MOST CORPORATE PO's SHIP THE SAME DAY (SUBJECT TO CREDIT APPROVAL)

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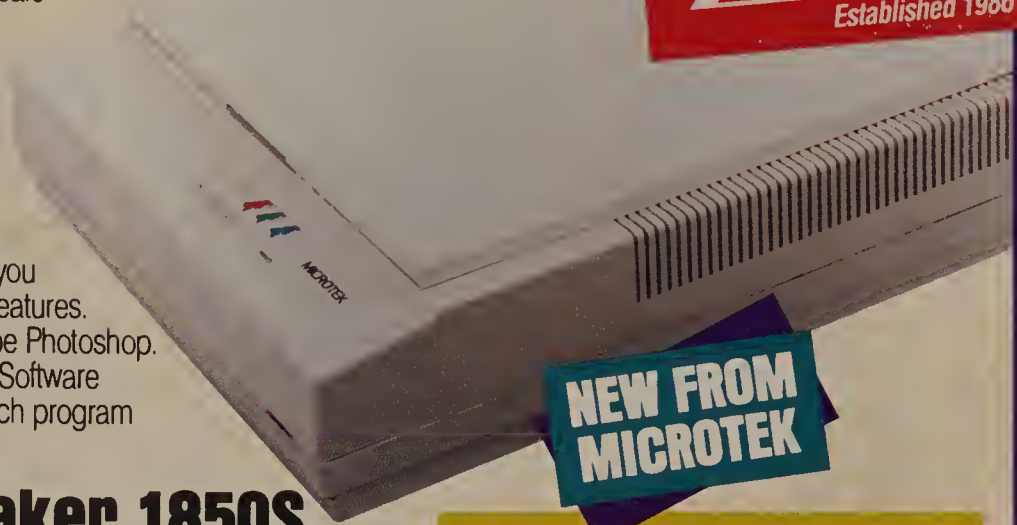
ScanMaker 600ZS

$1599

Introducing the ScanMaker 600ZS, the newest addition to Microtek's award-winning series of color/ grayscale scanners. Capable of scanning 24-bit color, 256 shades of gray and black and white, the ScanMaker 600ZS captures images with up to 600 dpi resolution. It boasts outstanding color image quality and features a new, compact flatbed design. A built-in SCSI interface makes installation a snap! More amazing is the price... hundreds less than you would expect to pay for a scanner with this many unbeatable features. Included with every ScanMaker 600ZS is a full version of Adobe Photoshop. Adobe Photoshop, winner of MacUsers' 1990 Eddy Award for Software Product of the Year, is a sophisticated image editing and retouch program designed for artists and desktop publishers. #00369



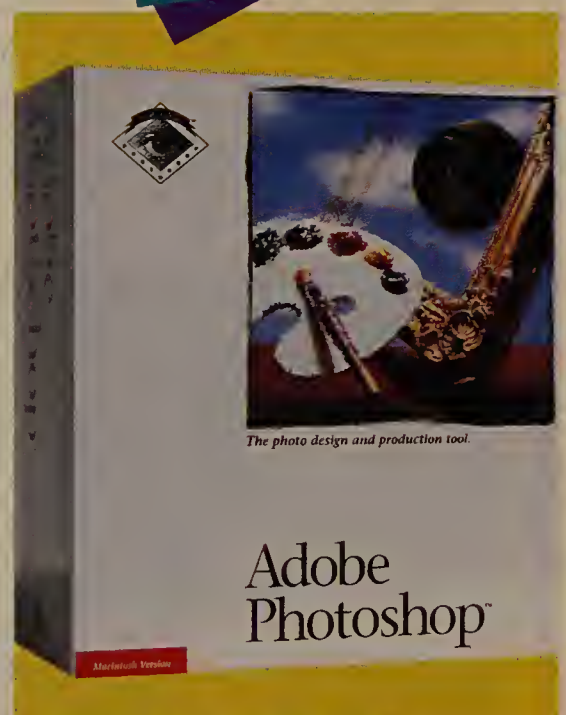
NEW FROM MICROTEK

NEW FROM MICROTEK

ScanMaker 1850S

$2299

Microtek's ScanMaker 1850S is a revolutionary new 35mm slide scanner that's perfect for desktop publishing, presentation graphics and multi-media applications. You can scan 24-bit color and 256 shades of gray at up to 1850 dpi resolution. With a scanning area of 35mm x 35mm, ScanMaker 1850S is versatile enough to scan slides in protrait and landscape modes. Included is a full version of Adboe Photoshop (winner of MacUser's 1990 Eddy Award for Software Product of the Year), a sophisticated image-editing and retouching program designed for artists and desktop publishers. #00370



BOTH SCANNERS ARE BUNDLED WITH ADOBE PHOTOSHOP— MACUSER PRODUCT OF THE YEAR!

HARDWARE

DESIGNED FOR IMAGE-INTENSIVE APPLICATIONS

Color Monitor

$569

Today's color applications demand fast CPUs, superior software and high resolution input devices. To complete the system, a monitor designed especially for the demands of image intensive applications is required. The MCD-1403 provide the truest image reproduction for all of your color applications. #04122

MICROTEK
Better Images Through Innovation.

LOW INTRODUCTORY PRICE!

TrueLaser Printer

$1799

If you're in search of a laser printer that's fast, flexible and simple to use, you've just found it. TrueLaser is the first laser printer that's fully PostScript, TrueImage, and PCL compatible. TrueLaser is also the first printer to come bundled with 35 resident TrueType fonts. Its combination of flexibility, superior speed and sensible price offer an affordable way to make your published work look its best. Six month on-site warranty. #04047

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THUNDERWARE

Now there's a LightningScan model for every Mac! In one quick pass logos, photos, drawings, graphs, and text become Macintosh graphics. Scans 4.2 inches with selectable resolution up to 400 dots per inch. Use with any publishing, drawing, painting or OCR program. Includes ThunderWorks®, the image scanning and editing application rated tops by Macworld, MacUser, Publish and Pers. Publishing. The SnapGuide system is included to make straight scanning easy.

LightningScan 400

$384

Rated best by all Mac magazines, two years running! Includes a SCSI controller with RAM, external termination and detachable cable make set-up easy. A full-featured scanner for all Macs with up the 37 levels of gray. Can be used with all Macintosh computers. #02212

LightningScan Compact

$289

Scanning just became more affordable and portable than ever! Using a small disk port interface, LightningScan Compact is the easiest scanner to set up and use. No external power supply required. #00519

Lightning Scan Pro 256

$499

The choice for Macintosh graphics professionals! The Pro scans in 256 levels of true gray at resolutions up to 400 DPI. The powerful SCSI controller includes RAM, external termination and a detachable cable to make setup and scanning fast and easy. Perfect for camera-ready art. No other scanner can match it for speed, flexibility and price. #00520

#01242 Thunderscan Plus $198

#01353 Mac II Power Accessory $42

Niscan Spectra For The Mac

$624

Give your pre-press and multi-media projects 24-bit color polish with NISCAN Spectra for the Mac. NISCAN Spectra scans 16 million colors in one 4-inch by 6-inch scan pass, at resolutions of 50 to 400 dpi. This small-format scanner with an upside down flatbed scanning mechanism allows you to place the scanner over your image to scan. For users who want a scanner that does it all, NISCAN offers not only 16 million colors, but 256 colors, 8-bit gray-scale, line art, and transparency scanning. NISCAN Spectra is also ideal for image capturing and image database archiving. ScanDo/DA software lets you run NISCAN Spectra under Finder and MultiFinder. Using NISCAN Spectra is easy: it simply connects through your modem interface. NISCAN Spectra is compatible with the Macintosh SE and SE/30 and all Mac IIs and higher. #04260

WITH THE MOST SOUGHT-AFTER FEATURES

DoveFax Plus

$358

DoveFax Plus offers fax software features such as: full background operation when sending or receiving a fax (with or without Multifinder); automatic answer, which allows you to receive a fax without interruption; redialing, which guarantees fast delivery; pre-scheduled transmissions, that allows you to send multiple faxes after hours when rates are lower; customized cover sheet and more! The DoveFax Desktop can by upgraded to the DoveFax Plus with the simple addition of a microphone and software. #03514

WITH GRAPHICS EDITING CAPABILITIES

Relisys TeFax

$869

Now you can send or receive faxes directly from your Macintosh and get a 16 level half-tone scanner and a 200 dpi printer all in one very convenient and portable package. Relisys introduces the NEW TEFAX System RA2125 - a complete tax system that gives you the advantages of both a dedicated fax machine with the convenient software package, AutoFAX. NEW AutoFAX software includes powerful graphics editing capabilities for scanned or faxed documents. #00256

HARDWARE

20

NOW ORDER ON COMPUSERVE — GO MZ

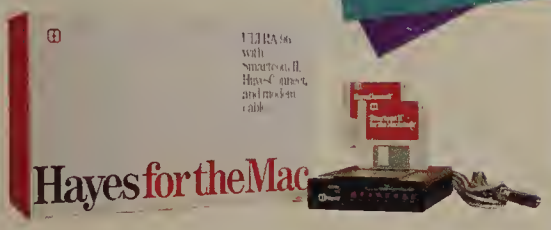
Hayes Microcomputer PersonalModem 2400 Plus

$149 Specially designed to simplify communications for the first-time home or business user, Personal Modem Plus products offer a completed PC or Macintosh communications solution since they are bundled with Smartcom communications software and come with permanently attached computer and telephone cables. #00451

Hayes Microcomputer Ultra 96

PACKED WITH FEATURES

$925



Need 9600 bps V.32 capability? Need compatibility with 2400bps, or 300bps modem? Data compression? Error-Control? V.42 error control and V.42bis data compression provide error-free throughput to 38.4 kbps over dial-up phone lines. It even includes support for MNP 2-4 and 5 for backward compatibility with your old modems. If you're a Packet Switched Network fan, you'll love the V-series PAD for dial-up access X.25 networks. #00452

PROMETHEUS MODEMS

ProModem 9600m Plus

$698 The most feature-filled fax modem available.

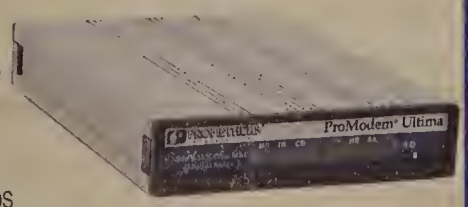
Offered with MaxFax fax software, this 9600 bps data modem/9600 bps send and receive fax provides advanced functions like gray scale capability, customizable cover pages and the ability to import/export phone book data. Other features include a complete phone book, background operation, scheduled transmissions, distributions lists, and excellent status reporting. Packaged with Macknowledge communications software and cable. #03608

ProModem 24/96

$294 Prometheus has added V.42bis/MNP-5 data compression and error correction for no additional cost. That means you can now get up to 9600 bps throughput on a 2400 bps modem. In addition, receive fax capability is now available in a mini-sized fax modem with the introduction of the ProModem 2496 S/R Minifax. With new features, low prices and all the software included, you won't find a more complete communications solution! #03319

ProModem Ultima

$749 Get the same fax features (9600 bps send/receive fax and Maxfax 3.0) in a 14,400 bps data modem with the ProModem Ultima. Ideal for large file transfers, network bridging and remote access programs like Timbuktu/Remote. Also includes MAC-KNOWLEDGE. #00062



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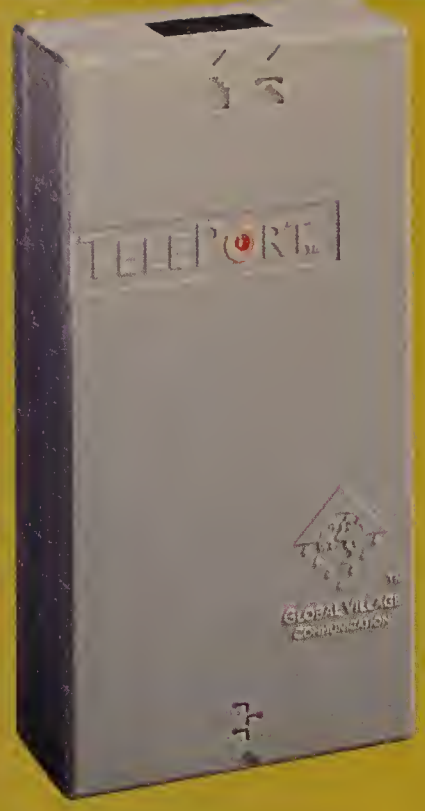

Global Village TelePort Fax 24/96

$184

Send faxes with the push of a button. TelePort plugs into your ADB connector (like your mouse and keyboard), eliminating a power adaptor, freeing your serial ports, and enhancing portability. TelePort, 2400 baud Hayes compatible modem, incorporates MNP5 data compression/error corrections. Eddy Award 1990 #00395

NEW

Best Data Products Smart One Modem

The Smart One 2400XMAC Stand Alone modem for Macintosh Plus, SE and MAC II is a complete communication package for beginners and experienced modem users alike. Incorporating the latest in CMOS technology, Smart One runs cooler, lasts longer and uses less energy than other modems, thus providing the high quality and performance Macintosh users have come to expect. With your convenience in mind, Best Data Products has included software, cable, technical support... everything you need for immediate hookup! 2 Year Warranty includes Prodigy startup with offer. #04243

$99

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Established 1986.

US Robotics Courier HST STD V.42

$675

The Courier HST modem combines the best ideas in data communications technology to provide new benchmarks in value and performance. It's as easy and familiar to use as any 2400 or 1200 pbs modem. Same features, "AT" commands and software compatibility. In fact, Courier HST automatically connects with 2400, 1200 or 300 bps modems, with or without error-control. And you get data compression at 2400 and 1200 bps as a bonus! When you buy Courier HST, you get U.S. Robotics' more than twelve years of modem experience, gained through sales of nearly a million modems. We're an organization that will support and grow with your needs. #01057

NEW

Supra Corp. SupraModem 2400 MacPac

$178

The SupraModem MacPac includes everything you need to get started, even the cables. The Hayes compatible SupraModem 2400 features auto-answer and auto-dial and a call monitoring speaker. Microphone 1.5, the award-winning modem software included, makes sending and receiving data a breeze. And, you get a free subscription to America Online, the exciting Mac-based information service. #03368

Applied Engineering Mac LC Modem 24/96 w/Send FAX

$245

Maximize your LC with this multi-function internal card. More than 2400/9600 data/fax modem, the card gives the LC a math co-processor socket and even an extra port (system 7.0 compatible)! The V.42bis option offers 9600 bps error-free data transmission. Send-Fax is standard with Receive-Fax available in the near future. The package has everything you need to get on-line fast including communications software, more than $200 dollars of network memberships and on-line time included free and a five year warranty. #03980

Computer Peripherals 2400/9600 Modem

ViVa offers the latest modem technology capable of meeting today's communication standards. With data compression, error control, leased line support and automatic functions, it porvides reliable performance under the most demanding conditions.

#04271 24 FX (2400bps w/send Fax) **$159**

#04272 9642E (9600 Fax/Modem) **$479**

UNLIMITED STORAGE CAPACITY

Cal-Abco MACLegend HD 45 MB REM EXT

$539

With a 20ms average access time and unlimited storage capacity, the MACLegend removable cartridge sub-system has more to offer than a standard fixed drive. The ML45RD can be used for archiving data, backing up a fixed drive, securing sensitive data, transporting data or as your primary drive. #00921

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A far-extending 6,000 story compendium from Xiphias of key events in science and technology. From the Big Bang to the Super Collider, all entries are completely cross-referenced with 1,000 multi-media graphics and stereo effects. It's the fifth best-selling CD-ROM product on the market!

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You've got the whole world at your fingertips with the finest interactive printable CD-ROM that puts you just a "click" away from 240 maps of the world, individual countries, regions and counties. Incorporating geographic, demographic, economic, government and communications data in a brilliant presentation will get high marks with this indispensable Atlas/Almanac world fact book.

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Aviation to zebras, this encyclopedia captures the sights and sounds of information in living color. It contains 33,000 articles, 1500 full-color graphics including 250 maps and stereo sounds that speak volumes for its capabilities.

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"Best selling CD-ROM encyclopedia on the market." Bureau of Electronic Publishing

General Reference Bundle With NEC CDR-36

$499

#04133

Very rarely does a new product come along that turns an industry on its ear. ● Such is the case of CD-ROM with its massive capacity that allows you to experience the exhilaration of living color, sound and special effects. so you're in for one of the most exciting interactive, sensory experiences you've ever had sitting down. ● Get three of the current top ten CD-ROM software titles: *The New Brolier Electronic Encyclopedia*™, *The Time Table of History* and *The Software Toolworks® World Atlas,* with your speical discounted purchase of the high-performance NEC Intersect™ CDR-36 portable CD-ROM reader. ● Act now and save $750 from the manufacturer's suggested retail price on this exclusive package at just $499* for Macintosh and $579* for IBM XT/AT and $599* for PS/2. Or, upgrade to the fastest CD-ROM reader on the market, the NEC CDR-73 at the low price of $739* for Macintosh, $799* for IBM XT/AT and $869* for PS/2. ● This essential reference package includes an Interface Kit for either Macintosh, headphones with CD-audio software diskette to play stereo music CD's, and quick-install program diskette which installs the reader and the three CD titles instantly. The big plus is toll-free telephone access to the NEC hotline for hardware or software technical assistance and a 2-year limited hardware warranty. ● But be mindful. While your mental capacity may be limitless, the supplies for this promotion are limited. (Offer expires January 15, 1992.) *Suggested retail price; actual price may vary depending on dealer

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HARDWARE

23

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POWERFUL DRIVES FROM MASS MICROSYSTEMS

DataPak 45Mb & 88Mb Removable Cartridge Drives

Voted the best by the industry critics, it's still the first family of removable cartridge drives. With 45 or 88 megabytes on each removable cartridge, they're an inexpensive way to add capacity and backup your valuable data. Actually faster than many fixed hard drives, the DataPak comes with dual SCSI ports, SCSI cable, external terminator, auxiliary AC power outlets, external fuse and surge protection, and built and tested with high quality componentry. PadLok utility software provides password protection and volume partitioning. Each DataPak comes bundled with the DiskDoubler data compression utility from Salient. All DataPac drives are covered with a two-year warranty and an 800 technical support line.

#00175 DataPak 45 Meg (Plus/SE/Classic footprint) **$649**

#00176 DataPak IIc (Mac IIcx/IIci footprint) **$699**

#04062 DataPak 88 Meg **$999**

DataPak MO 512Mb Removable, Rewritable Optical Drive

$2899

The DataPak MO is a high speed read/write/erasable optical drive with 512 megabytes of storage capacity on a removable cartridge, features the fastest disk rotational speed of 3000 rpm and a 64K data cache for fast data access and throughput. A highly reliable system, the DataPak MO features a non-contact laser read/write system that eliminates head crashes and does not deteriorate data over time. Designed to operate on any SCSI-based Macintosh, the DataPak MO is ideal for any application that requires high capacity backup or archiving of files. The drive includes a unique anti-dust filtering system that eliminates head contamination. Each DataPak MO comes bundled with the DiskDoubler data compression utility from Salient. All DataPak MO drives are covered with a one-year warranty and an 800 technical support line. #00177

#00164 Optical Cartridge **$208**

HARDWARE

24

CALL OUR MACADVISORS FOR HASSLE-FREE ORDERING.

iDS PORTABLE HARD DRIVES

The Mac Zone
Established 1986

From the affordable Pro to the ultra compact Clipper, iDS has a portable hard drive to fit your needs. All iDS drives include state-of-the-art features like automatic termination which means you never have to worry about when and how to terminate your drive. iDS drives come tested, pre-formatted and loaded with SCSI Express utility software which is fully System 7 compatible including virtual memory support. iDS drives feature fast access speeds, over 5 megabytes of public domain software, rugged shock resistance construction, and a 2 year warranty.

45Mb Removable Drive

$589 The 45 Syquest removable hard drive provides the standard in back up, data security and unlimited data storage capacity. The new iDS Syquest removable features a closed front Bezel for filtered air intake resulting in a more reliable, dust-free operating environment. At 20ms average access speeds, you won't sacrifice speed to get the lowest cost per megabytes hard drive. Two year warranty. #00802

WIP 50Mb Drive

$449 If you're looking for optimum speed the iDS Wip drive delivers access speeds as fast as 15ms. The sleek portable design measures 1 x 5 x 8, so the Wip travels easily when you need to take your data with you, or lock it up for security reasons. The Wip drive includes one 50 pin SCSI port and an external wall mount power supply, so you can be sure the Wip will function with any Mac regardless of power output, even the Plus. Two year warranty. Optional carrying case available. #00170

ProDrive 40Mb

$339 The award winning Pro drive from iDS combines the power of a full size drive with the convenience of a portable at a price anyone can afford. The Pro drive is fully System 7 compatible including virtual memory support and includes state-of-the-art features like automatic termination, so you never have to worry about when or how to terminate your drive. The Pro comes pre-formatted with SCSI Express Utilities, includes over 10MB of shareware software, and carries a full two-year warranty. #00165

Clipper 40 MB

$499

The new ultra compact Clipper from iDS delivers powerful storage capabilities and convenient portability. Weighing just 10 ozs., the Clipper fits easily into a briefcase and plugs directly into the back of any Macintosh computer via its unique pass through SCSI port. The Clipper features full System 7 compatibility, automatic termination, a rugged 100g shock rating, a two year-warranty, and comes pre-formatted with our SCSI Express Utilities and over 10MB of shareware software. #00807

iDS Hard Drives

PART # / DESCRIPTION	PRICE
00144 CLIPPER 20MB	399
00166 iDS PRO DRIVE 80MB EXT	449
00167 PRO DRIVE 130MB	595
00169 WIP DRIVE 40MB	379
00171 WIP DRIVE 100MB QLPS	699
00172 WIP DRIVE 120MB	739

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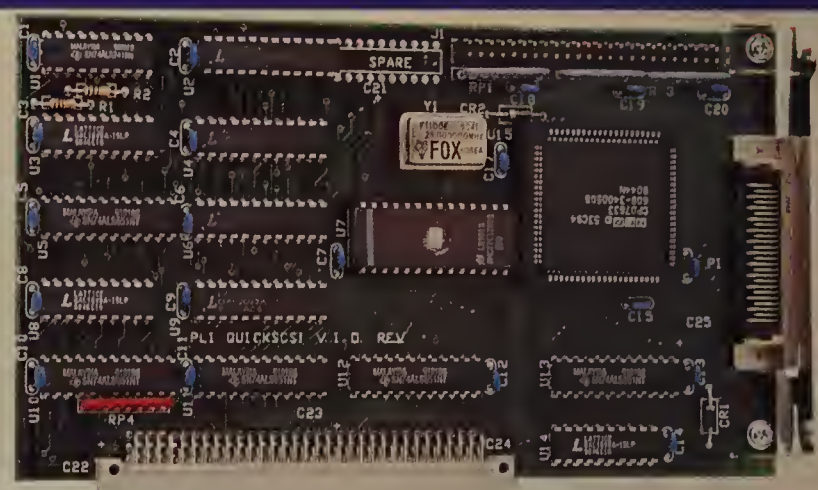
INNOVATIVE PRODUCTS FROM PLI



PLI CD-ROM

$699 The PLI CD-ROM is the most fully-featured drive available. It has a self-cleaning objective lens, eliminating bothersome dust problems. It offers audio output through a 1/8″ headphone jack and two RCA jacks. Volume control for the headphones is provided by a convenient dial on the front panel. PLI software is compatible with virtually every CD-ROM drive on the market, and supports all of the HyperCard audio XCMDs. It also allows channel control on those drives which support it. #03691

SUPPORTS HYPERCARD AUDIO

QuickSCSI Card

$399 QuickSCSI offers a simple and economical, yet powerful way to eliminiate the Macintosh SCSI port bottleneck. It lets your hard drive work at maximum possible speed by supporting data transfer rates up to 6 Mb/second. The disk cloning option lets you copy the exact contents of one entire drive to another. Run up to 45 SCSI devices simultaneously. #00811

PLI Infinity 40 Turbo REM HD

$699 The Infinity 40 Turbo uses PLI's turbocharged driver software to attain a 20ms access times. With the TurboCache disk accelerator software and TurboBoost, you can achieve near zero effective average access times. This removable 45Mb drive gives you infinite storage potential with removable cartridges. Each one holds 44Mb and costs only slightly more per megabyte than floppy disks. #02181

PLI Infinity Turbo 88

$979 The Infinity 88 Turbo removable gives you infinite storage potential with the new 88 Mb removable cartridges, and with the TurboVCache disk accelerator software and TurboBoost, you can achieve near zero effective average access times. #00182

INFINITE STORAGE POTENTIAL

HARDWARE

26

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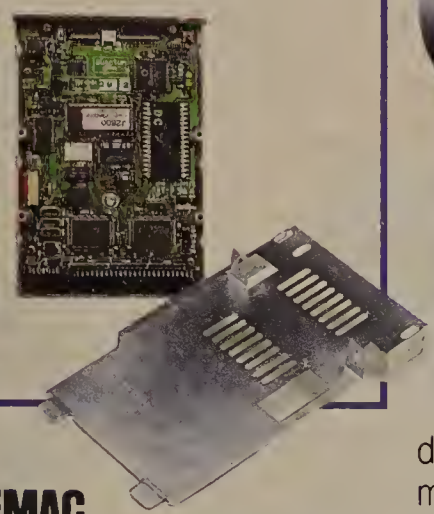
FOR THE HIGHEST THROUGHPUT

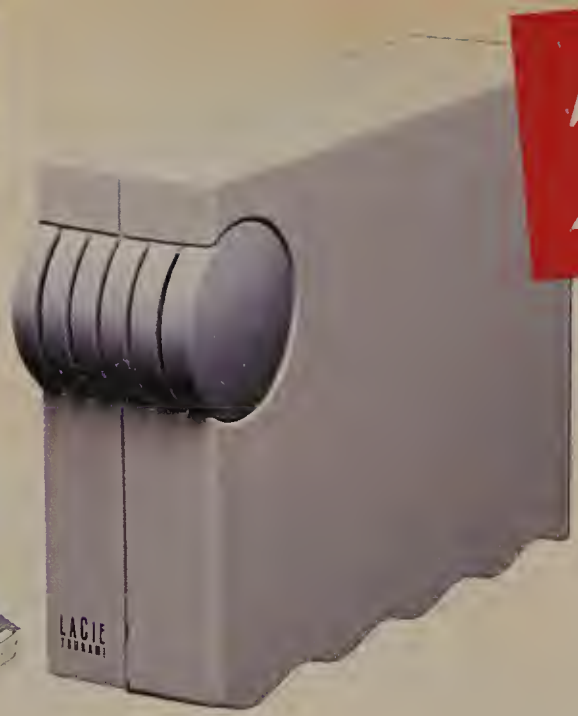
DataCel 52 QLPS

$329

Datacel drives achieve the highest throughput in the industry by using award winning Quantum LPS mechanism and easy to use hard drive formatting software. Our internally mounted drived unit will provide quick, reliable mass storage for your Mac II, IIx, IIcx, IIci, or IIfx. #04033

#00019
Datacel Int 105 Mb QLPS IIci/cx **$499**
#00163
Datacel Quantum 210 Mb Int H . . . **$949**
#00405
Datacel 52 Mb QLPS Ext Hd **$429**
#03683
Datacel 105 Mb QLPS Ext Hd . . . **$549**
#04225
Datacel Int 105 Mb QLPS SE/II . . . **$499**
#04693
Datacel 52 Mb QLPS Int IIci **$329**





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LaCie 50Mb QLPS

$699

Tsunami drives come initialized with SilverLining, the standard of hard disk utility software, and SilverPlatter. Apple's system, five megabytes of public domain software and Norton Utilities are also included on the drive. LaCie features a warranty of 5 years on the Tsunami drive. #03948

#03949 100mb Tsunami **$929**

EMAC 150mb Tape Back Up

$715

EMAC's Impact Tape drive is compact, yet it's anything but lightweight in performance. The Impact Tape drive will back up 155Mb onto one cassette at a super-quick 5Mb per minute. Complete with Dantz Development's Retrospect software for system 7.0 compatibility. Users can preschedule regular and unattended backups. Complete package with all cables, tape, software and terminator. #02161

Generation Systems

The Publisher Series by Generation Systems features full-page and dual-page monochrome display solutions for all Macintosh models. In addition to the Portable Benefits, you receive additional workspace, flicker-free refresh rates, anti-glare coating, and a tilt and swivel base that adjusts to any viewing angle.

The Designer Series offers high-resolution 8 and 24 bit color display systems built to energize your passion to produce beyond your own perceived visual capabilites. The Designer 8 is a high-performance Trinitron® system offering 8-bit color/gray scale for the Mac II, SE/30 and LC. The Designer 24 features our patented R.A.C.E. technology and outperforms all other non-accelerated 24-bit boards. Low power consumption permits use in all Mac IIs, including the IIsi.

For Mac SE/SE 30/II/LC/Classic Full Page Display **$599**

For Mac II 20" 8-bit Color **$3299**

ADVANCED HARDWARE FROM CORE

Core Optima

The Optima Series consists of external SCSI hard disk drives in capacities of 80, 120, and 200 MB. OPTIMA drives are available for the full line of Macintosh computers— with all the features you need. #04165

$599

#04164 250Mb Optima **$1249**

#04166 120Mb Optima **$749**

Core HC

The HC Mac Series consists of SCSI hard disk drives in capacities of 330, 650, 1000 and 1300 Mb. HC Series drives are available for the full line of Macintosh computers— with all the features demanding users require. #04208

$2195

#04209 HC 650Mb HD Ext **$2899**

#04210 HC 1000Mb HD Ext **$3995**

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RasterOps 24STV

$1299 New generation 24-bit True Color display board with real-time video in a window. The 24STV drive a 13" monitor in 1,2,4,8, or 24-bit color modes at 640 X 480 resolution featuring a 2X and 4X Pan/Zoom and Extended Desktop. A 1-bit mask plane allows windows or buttons to overlay live video windows. MediaGrabber application program included to provide extensive control over the display and capture of a single video game or a sequence of frames for use as an animation file. #00005

#00035 RasterOps 24S **$589**

RasterOps Video Expander

#03482

$525

$769 RasterOps Video ColorBoard 364 NTSC

The Video ColorBoard 364 is a 24-bit display board that has a 640 x 480 display resolution. Using the RasterOps video desk accessory you can set and save the settings of the hue, saturation, brightness, contrast, white level, black level, video speed, window size, window position, image cropping variable aspect ratio and video source. Pan and zoom of 2x and 4x are standard. Frame grabbing application program included. #03427

SIGMA DESIGN L-VIEW MULTI-MODE MONITOR

$1299 An ergonomic monitor design offers user-oriented details like a tilt-swivel base and paper white phosphor. L-views's Low-Emission design meets guidelines for electromagnetic field emissions established by the Swedish National Board of Measurement and Testing. L-View includes video card, 19" monitor, control panel software, and user's guide. #03854

E-Machines Color Page E 16

$1148 The E16 is a trisync monitor, capable of three resolution modes: 640 by 480 pixels at 55 dpi using the built-in video of the Mac LC, IIsi or IIci; 832 by 624 pixels at 72 dpi with E-Machines' XL8 and XL24 and upgraded Futura/24 boards; and 1,024 by 808 pixels at 87 dpi, although no current E-Machines board can drive it at that resolution. #04105

radius™ Color Pivot Display System

$1450 First color full-page display for the Macintosh computer. Displays a full page in either portrait or landscape mode. Display interfaces enable users to choose between full page (82 dpi) or actual size (72 dpi) resolution, and up to 256 colors on screen. One year warranty. #04206

OVERNIGHT SHIPPING ONLY $3 VIA AIRBORNE EXPRESS

Applied Engineering 1.4mb Floppy

$228 Add a second 1.4Mb drive to any SuperDrive-equipped Macintosh and make back-ups and disk copying easy. Applied Engineering 3.5 external high-density drive looks and performs like Apple's but costs much less. The drive incorporates the same high quality Sony mechanism Apple uses and features auto-eject, MS-DOS compatibility, and AE's exclusive two-color read/write indicator light. #03672

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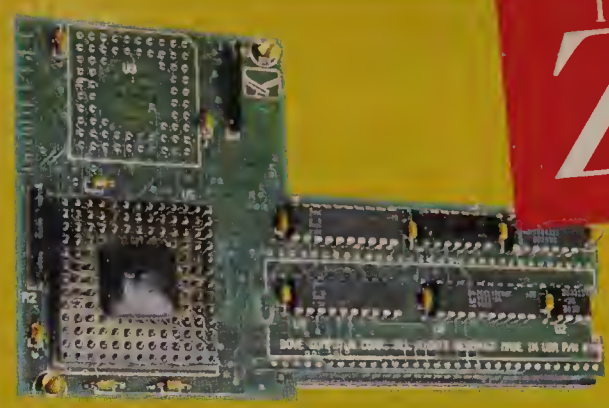
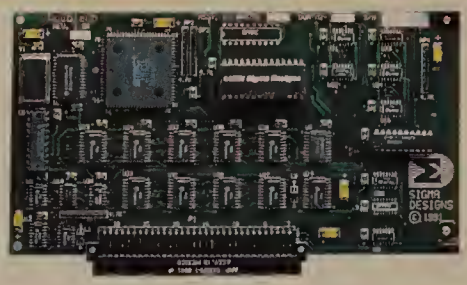


Dove 030 Upgrade Board w/Virtual Memory #03228 **$528**

Sigma DoubleUp Board

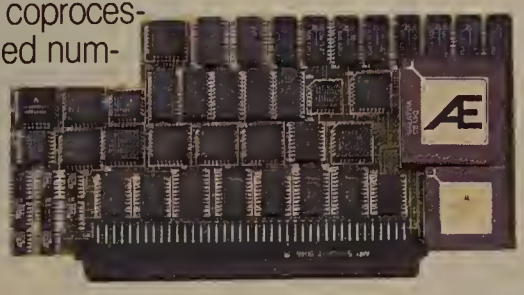


$167 DoubleUp is the first real-time lossless file compression card for the Macintosh NuBus family of personal computers. It enables users to more than double the effective storage capacity of their hard disks. Real-time compression means that data, images, and applications can be compressed and decompressed at speeds that are virtually unnoticeable to the user. The lossless compression method ensures that data is never lost or altered. #00215

SPEED UP YOUR MAC WITH THESE APPLIED ENGINEERING PRODUCTS

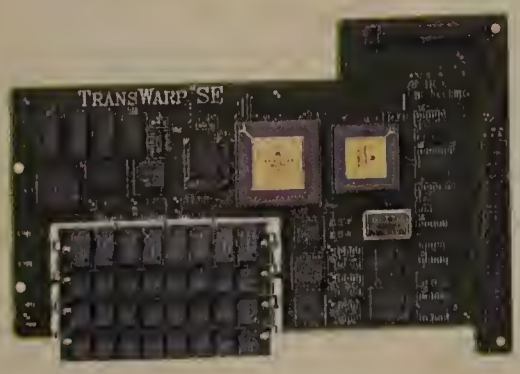
Applied Engineering Cache-In 50

$1899 Cache-50 blasts your IIci's speed beyond the speed of the IIfx! The ultra fast 50MHz 68030 CPU combined with an advanced 64K cache gives your IIci the power you've been longing for. The board comes complete with a 25MHz 68882 math coprocessor chip for high speed number crunching. One-year warranty. Seat-belt not included. #04072



TransWarp SE

$689

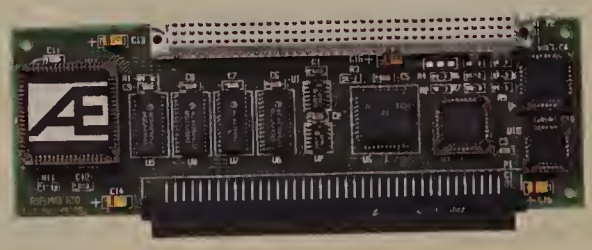


Accelerate Your SE to Warp Speed.

- Up to 10 times faster than standard SE!
- MC68882 Math Chip (Optional)
- MC68030— 25MHz or 40MHz
- Standard SIMM Sockets
- Expansion Connector (for third-party cards)
- Surface Mount Technology
- Full One-Year warranty #04153

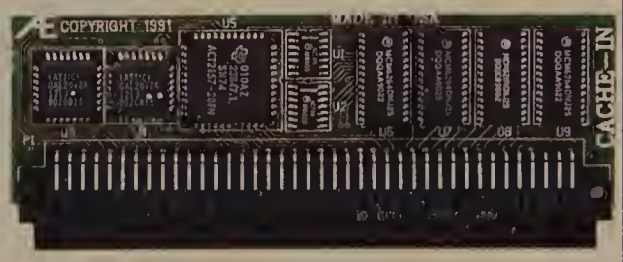
QuickSilver

$269 QuickSilver gives your IIsi a slot extender, cache card and math-coprocessor (optional). The extender enables cards created for the SE/30 to fit neatly inside the IIsi case. The 25ns static RAM cache provides quicker screen refresh, faster scrolling and rapid image manipulation. The 68882-20MHz FPU option greatly increases the speed of math-intensive applications. Five-year warranty. #00833



Cache-In

$194



Boost your IIci's speed by up to 40% with AE's low-cost/high performance cache card, Cache-In. Cache-In uses a technique known as RAM caching to eliminate the time that the CPU waits for information to be retrieved from the motherboard (wait states). Cache-In provides a lot of performance for a little cache. Five-year warranty. #00289

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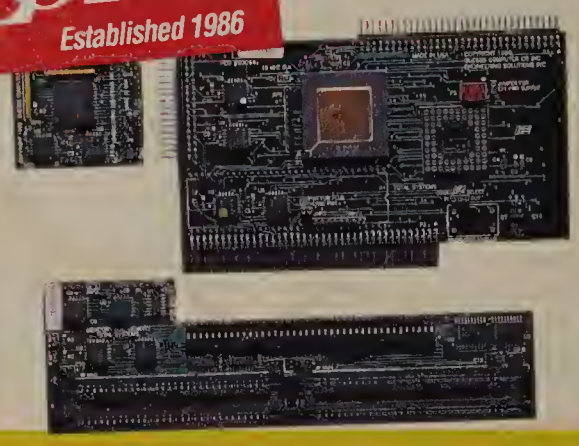
UPGRADE YOUR MEMORY WITH TOTAL SYSTEMS

ACCELERATOR & UPGRADE BOARDS



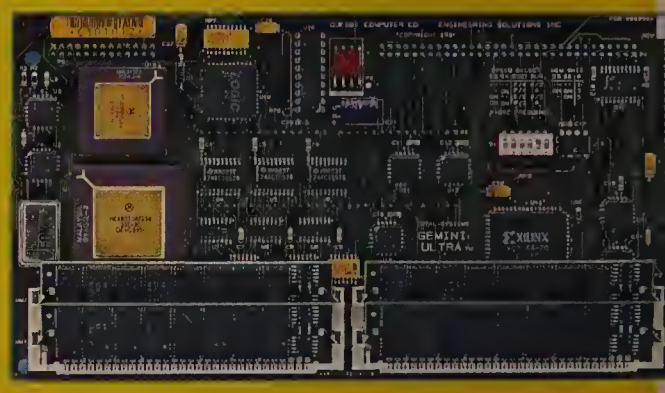
Mercury 030™

TOTAL SYSTEMS devised the low-cost Mercury 030 to deliver reasonable power for reasonable people at a rate of their choosing. This well-balanced accelerator card for the Plus and earlier Macintoshes is fast, with 32-bit RAM module for even greater speed, and even faster with the SCSI module added. The modular design keeps costs under your control, letting you add power when you decide you need it. Free VIRTUAL™, free fan and uprated power supply for reliability included. Can accommodate a range of affordable large-screen options. A budget-booster, not a budget-buster!

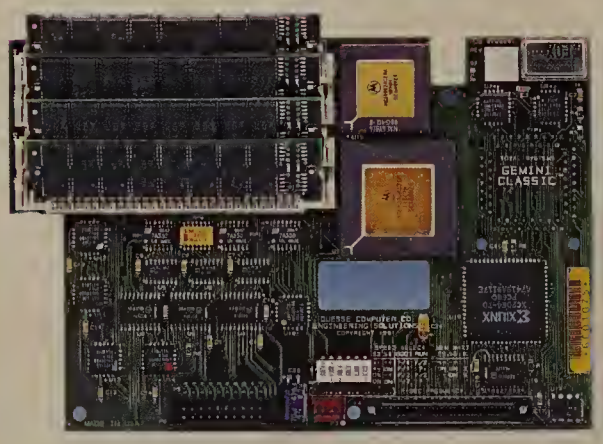
#00034 16MHz with FPU (Plus) . . . **$675**
#00036 16MHz w/o FPU (Plus) . . . **$518**
#00041 16MHz with FPU (SE) . . . **$550**
#00045 16MHz w/o FPU (SE) . . . **$388**

NEW! Gemini Ultra™

The Ultimate accelerator for the SE and earlier Macs from the award-winning Gemini lineage. The formidable, pace-setting Gemini II has been redesigned from the ground up for more speed, more reliability, easier installation, and 4MB SIMM support for upto 16MB or RAM. Choose from 20MHz, 25MHz, 33MHz, 40MHz 68030 CPU speeds. Burst-mode RAM access adds 15% more speed than equivalent Gemini II configurations. Optional 68882 math coprocessor. 128K, 512K, Plus version includes free high speed SCSI, fan, and power supply; clip-on connector. VIRTUAL is included, free! Now the untouchable leader!



#00541 20Mhz . . . . . **Call**
#00542 20Mhz w/FPU . . . . . **Call**
#00543 25Mhz . . . . . **Call**
#00544 25Mhz w/FPU . . . . . **Call**
#00532 33Mhz **$1379**
#00534 33Mhz w/FPU **$1679**
#00535 40Mhz **$1479**
#00536 40Mhz w/FPU **$1849**

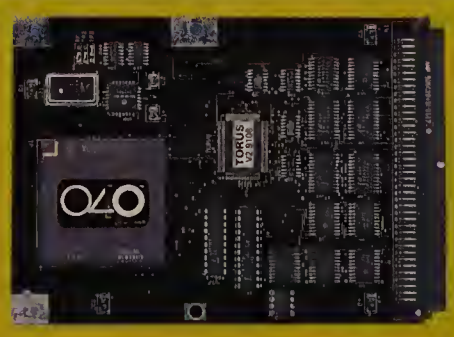


Gemini Classic™

A Classic-Booster takes off! Run up to 100 times faster with the first and ultimate 32-bit accelerator for the Macintosh Classic. Built with the attention to detail that created the awards-winning Gemini series of accelerator cards. Choose between 20Mhz, 25Mhz, 33Mhz, 40Mhz or 50Mhz 68030 CPU. Upgradable between different processor speeds. Optional 68882 math coprocessor and 4Mb or 16Mb of RAM using standard 1Mb or 4Mb SIMMs. Includes special clip-on connector— no soldering required. Auxiliary power supply keeps your Classic cool.

#00527 20Mhz **$949**
#00528 20Mhz w/FPU **$1049**
#00529 25Mhz **$1179**
#00530 25Mhz w/FPU **$1349**
#00531 33Mhz **$1449**
#00537 33Mhz w/FPU **$1749**
#00538 40Mhz **$1549**
#00538 40Mhz w/FPU **$1749**

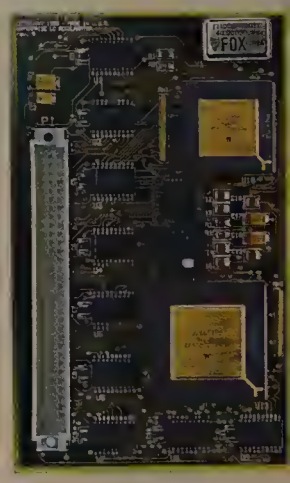
Magellan 040



The PREMIUM 68040 accelerator for the Macintosh SE/30 and IIsi! With Magellan 040 you get the jaw-dropping workstation power of a 35Mhz 68040 CPU, with PMMU and FPU built-in. SwitchMatic™ technology switches you between 68030 and 68040 with a few clicks— on the fly, no restarts— for 68040-finicky applications. High-end graphics, CAD, statistical analysis application as in other computer-intensive tasks fly past in a blur of speed!

#00293 Board IIFX **$2195**
#00291 Board IISI **$1995**
#00292 Board SE/30 . . . . . **$1995**
#00295 Board 040 IICI **$2195**

Enterprise 030™



Continuing the TOTAL SYSTEMS tradition of innovative, powerful and cost-conscious 68030 accelerator cards, now there's Enterprise 030 for the Macintosh LC. Give your sluggish LC the power it needs to drive that color display with the speed you want. This full 32-bit accelerator beefs up standard 68020 with a full-strength 16MHz 68030 CPU. Additional MC68882 floating-point coprocessor is optional. Enterprise 030 is easily installed in minutes into the Processor Direct Slot, and complies with Apple's power and thermal specifications. #00545 Enterprise 030 16Mhz

TOTAL SYSTEMS

30-60 DAY MONEY BACK GUARANTEE ON MOST PRODUCTS

LET DAYSTAR & MACZONE SPEED UP YOUR MAC

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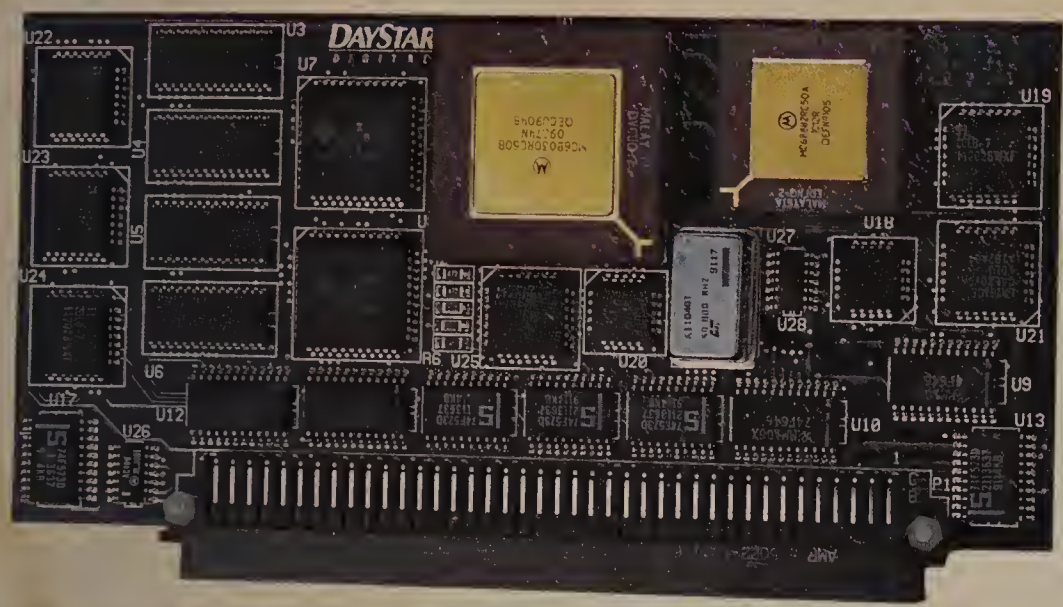

DayStar Digital PowerCache

The new PowerCache is even faster and is a "universal" performance upgrade. Its innovative design allows for complete transportability from one machine to another. The same card fits in almost any Mac from the LC and IIsi up to the IIci.

#04058 40 MHz w/FPU **$1199**
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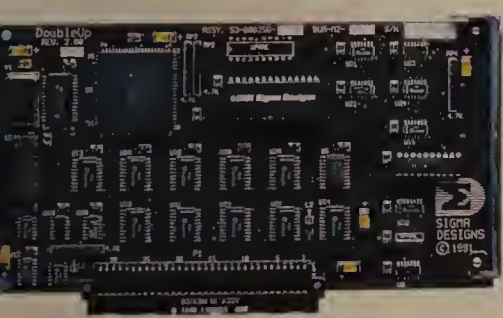
DayStar Digital FastCache IIci

$278 The powerful FastCache IIci allows the Mac to operate at maximum speed. The Mac IIci's processor can't run at its most efficient level without a cache card. The FastCache IIci plugs directly into the IIci's Cache Connector and boosts processing speed from 30% to 70%! Installation is as easy as plugging in a NuBus Card. #02877



Sigma DoubleUp Board

$167 Double your disk capacity with DoubleUp from Sigma Designs. DoubleUp compresses any data, image or application file quickly. Your disk capacity will expand by 100% or more. DoubleUp comes with DiskDoubler software for user-friendly operations, and a Macintosh NuBus card for unbeatable speed. The data is never lost or altered. #00215

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FPU is a floating point math co-processor

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$74 The SyQuest Removable Cartridge features low cost and high volume data storage. It is dependable and easy to use with unlimited storage. SyQuest is great for color scanning, data storage, and all kinds of back-up storage. #02183

5 Pack #04142 ..... **$360**
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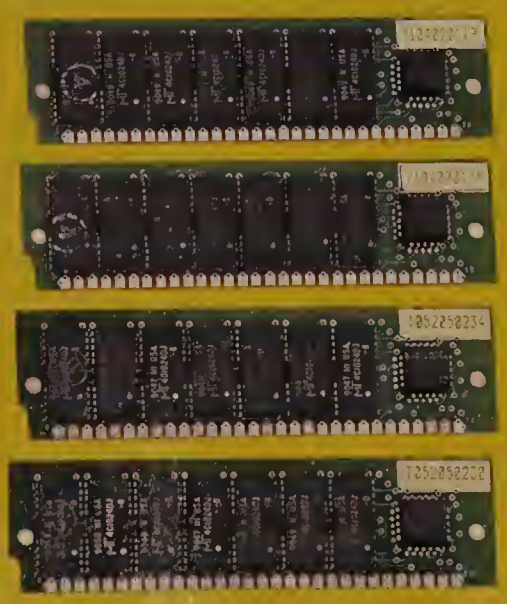

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$49 per Mb

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01880 Wetpaint Old Earth V 13-14 56
01881 Wetpaint Island Life V 15-16 56
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2586	Retrospect 1.2	150
3805	Retro 1.2 w/10Pk Remote	264
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3226	Menufonts 3.0	44
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3826	Fast Back II (2.5 New Ver)	117
2067	Powerstation 2.5	33
2194	Pyro! 4.0	24
2002	Suitcase II 1.2	48
1020	Superlaserspool 2.0 Single	92
1122	Superspool 5.0	61
Go Technology		
3991	Hot Keys	39
Icom Simulations		
3663	Mac Kern	58
1915	On Cue 1.3	34
Insight		
2423	Macprint 1.2	93
kent Marsh		
258	Folderbolt	58
1296	Macsafe II	106
1817	Night Watch	84
2755	Quicklock 2.0	56
Kiwi Software		
3680	Kiwi Finder Extender	64
Magic Software		
1244	Aulo Save II	26
3328	Backmatic	49
3329	Power Icons	38
Magna		
3406	Empower I Ver. 4.0.1	88
3407	Empower II Ver 4.0	149
Mainstay		
173	Clickpaste 2.0	59
3396	Marco Polo - 5 Pack	517
3395	Marco Polo - Twin Pack	251
3394	Marco Polo Single	151
3399	Mark Up - 5 Pack	517
3397	Mark Up - Single User	157
3398	Mark Up - Twin Pack	257
Medialac		
3778	Step Ahead 1.0	56
Microcom		
3823	911 Utilities	83
Microlytics		
1940	Gofer 2.0	44
Microseeds		
1946	Redux	48
3327	Rival	48
2005	Screen Gems	38
Microspot		
818	Macpalette II	54
Now Software		
3522	Screen Locker	44
Olduvai		
2237	Multiclip 2.0	68
On Technology		
3198	On Location 1.0.2	74
OnTrack		
3222	Disk Manager Mac 2.23	35

Part #	Description	Price
Preferred Software		
3556	Personality	
3554	Screen Shot	
Salient		
3515	Disk Doubler 3.7	
3516	Partner 1.01	
System Network Architects		
410	Offline Ver. 2.0	
Softview		
3533	Macinuse 3.0 Mac	
Solutions		
1091	Smartscrap & The Clip 2.0	
SuperMac		
1138	Disk Fit 2.0	
1356	Sentinel 2.2	
Symantec		
2754	S.U.M. II	
Tactic Software		
2854	Icon-It	
148	Masterfinder	
Williams & Macias		
3325	Disk Finder	
3324	My Disklabeler III	

BOOKS

Part #	Description	Price
Addison Wesly		
1585	Inside Mac, Vol. 1 0-201'	
1586	Inside Mac, Vol. 2	
1587	Inside Mac, Vol. 3 0-201'	
1588	Inside Mac, Vol. 4 0-201'	
1629	Inside Mac, Vol. 5 0-201'	
249	Inside Mac, Vol. 6	
1969	Inside Mac, X-Ref 0-201-	
3200	Mac Programming Primer	
2473	Mac Programming Secrets	
2864	Programmers Online Comp.	
Bantam-Double Day		
1438	Adobe Ill. Design Hndbk	
Goldstein & Blair		
3816	Mac Bible + What Do I Do	
4093	Mac Bible Gde To Filemkr	
375	Mac Bible Guide To Sys. 7	
3815	Mac Bible + What Do I Do	
3814	Mac Bible 3rd Ed.	
Harper Collins		
4068	Kawasaki's Selling Dream	19
Microsoft		
4099	Apple Mac 4Th Edition	19
4097	Dtp Design-Pagemaker	17
4102	Started w/Microsoft Word	14
4101	Started w/Apple Mac	14
4098	Mac C Prog. Primer	16
4104	Microsoft Excel 3.0 Comp	14
4103	Obj. Oriented Prog Think	24
4100	Works For The Mac	17
Redgate		
373	Mac Product Registry	

ELECTRICAL ACCESSORIES

Part #	Description	Price
American Power Conversion		
2464	Ups 110Se	2
305	Ups 370Ci	3
Applies Engineering		
4119	Mac Lc Heavy Duty Pwr Sup	1
Efi Corp		
280	Surge Prot Efi-153 6 Outl	
281	Surge Prot Efi-453/ 15'	
Kensington		
3338	Masterpiece Mac II	1
3349	Power Backer 1200	9
3345	Power Backer 360	2
3346	Power Backer 450	3
3347	Power Backer 520	3
3348	Power Backer 800	7
3339	Power Tree 10	
3342	Power Tree 20	
3343	Power Tree 50	
1314	System Saver Mac (Platinum)	
3344	System Saver SE	
Mac Tech Distributors		
1503	Tool Kit Mac W/Grinding Strap	
Mobius		
1832	Fanny Mac Qt Platinum	
Monster		
201	Macspeaker	1

COMPUTER LUGGAGE

Part #	Description	Price
I/O Design		
3792	Imagewriter II Bag - Black	
3875	Imagewriter II Bag - Blue	
3876	Mac Lug SE 30/SE Ext Blue	
3793	Mac Lug Classic/SE - Blk	
3907	Mac Lug Classic/SE - Blue	
3795	Mac Luggage II/IIfx - Blk	
3878	Mac Luggage II/IIfx - Blue	
3796	Mac Lug IIcx/Ci/Si - Blk	
3879	Mac Lug IIxc/Ci/Si - Blue	
3794	Mac Luggage SE Ext Black	
3905	Ultimate Classic Std - Blk	
3906	Ultimate Classic Std - Blue	
721	Ulti Mac Lc W/12' Mon-Blk	
722	Ulti Mac Lc W/12' Mon-Blue	
3797	Ultimate SE - Blk Ext	
3791	Ultimate SE - Navy Ext	
3788	Ultimate SE Neon - Green	
3790	Ultimate SE Neon - Pink	
3789	Ultimate SE Neon - Yellow	
Linebacker		
2090	Macpack Bag Mac/SE Xkb	
1352	Macpack Bag Mac/SE Xkb	
2089	Macpack Bag Mac/SE Xkb	
499	Macpack Bag Plus/SE Reg	
498	Macpack Bag Plus/SE Reg	
493	Macpack Bag Plus/SE Reg	
494	Macpack Imagewriter Bag	

NOW OPEN 24 HOURS A DAY

Part # Description Price

PLI
3692 PLI Infinity Turbo 40 Case 60
Targus
3195 Targus Imagewriter Bag Blue ...45
3476 Targus Bag Cx/Ci Black 74
2546 Targus Bag Mac/SE Reg Blk ...54
2545 Targus Bag Mac/Se Xkb Blk 74
2630 Targus Bag Mac/Se Xkb 74
2629 Targus Bag Mac/Se Xkb 74
2628 Targus Imagewriter Bag Blk 45

MEMORY & MATH CHIPS

Applied Engineering
4120 Fast Math Lc 139
3675 Mac Ram Portbl. 1Mb.....349
3674 Mac Ram Portbl. W/1 Mb ...395
3824 Mac R. Classic 1Mb Upgr. 118
Dove Computer
963 Macsnap 524Xe 198
964 Macsnap 524Xs 512Ke-1Mb 248
3817 Macsnap 596Xe 390
Marco International
3936 IIsi Simm Module 2Mb 680
8 Mac Port 2Mb Sram 540
9 Mac Port 3Mb Sram 799
7 Mac Port Sram 1Mb 280
3586 Simms 1Mb Ntx 49
3579 Simms 4X1Mb Fx 80Ns 248
3585 Simms 4X4Mb Fx 800
3976 Simms Lc (Two 4Mb) 399
Motorola
2425 68882 Math Co-Prc 33Mhz ...213
Pacific Data
9268 Pacific Data Laserjet III 2Mb ...159
SIMMs
3428 2 One Mb Simms (80Ns) 94
801 1X2X80Ns (2 Chip Sol'N) 90
3583 4X4Mb '030 799
Wyle Laboratories
2151 68882 Math Co-Pro 16Mhz ...130
2152 68882 Math Co-Pro 25Mhz ...180
2719 68882 Math Co-Pro 40Mhz ...299

CABLES

C Enterprises
1081 Ab Box Din-8 W/ 1 38
1082 Abcd Box Din-8 W/ 1 62
864 Din-8 To Imagwrtr II 15' 32
97 Db-9 To Imagewriter 2 8' 18
866 Din-8 - Imagewriter 2 6' 18
96 Din-8 To Imagewrt 1 6' 18
91 Din-8 To Imagewrt 2 15' 25
2079 Din-8 To Imagewtr 2 25' 32
2580 Gender Bender 25 To 25 10
94 Mac 512K To Modem 18
90 Mac Plus SE/II Modem 6' 18
2602 SCSI 50 Pin Ribbon (18") 16
2145 SCSI Cable M25-M25 6' ...11.5
667 SCSI Cable M25-M50 18" ...25
1917 SCSI Cable M25-M50 6' 39
1085 SCSI Cable M50-M50 18" ...25
2461 SCSI Cable M50-M50 6' 29
856 SCSI Terminator 25
Kensington
3360 Mac II Monitor Cable Ext. Kit 32
3359 Xtra Long ADB Keybrd 24
Mac Tech Distributors
3131 Mac II Ext Cable Kit 29
Orange Micro
1435 Grappler 9 Pin (C/Mac/Gs) ...93
2080 Grappler Mac Ls 70
3015 Grappler Mac Lx 109
2430 Grappler Spooler 46
Wyle
2513 SCSI Tester 39

RIBBONS

Abaton
233 Abaton Laserscript Toner 69
Golden Ribbons
231 Imagewriter Ribbon - Blk 3
235 Imagewriter Ribbon - Blue ...6
234 Imagewrtr. Ribbon - Brown ...6
236 Imagewrtr. Ribbon - Green ...6
896 Imagewriter Ribbon - Multi ...7
237 Imagewriter Ribbon - Red 6
Hewlett Packard
61 Hp Deskjet Cartridge (Blk) ...16
4041 Hp Toner Cart (P# 92295A) 75
2447 Hp Toner Cart(P#92275A) ...95
Kodak
117 Diconix Plain Paper Cart 11

LABELS

Avery Labels
3031 Dot Matrix Color Disk Label 80 ...6
3023 Labels Dot Matrix (250) #4241 ...13
3025 Laser Disk Labels (630) 28
3024 Laser Transparen. (Qty 50) ...22
CoStar
3607 Label Writer Labels (12 Pk) ...48
3490 Label Writer Labels (2 Pk) 11

STANDS

Basic Needs
812 Monitor Stand For IIcx & IIci 47
CoStar
3617 Costar Organizer Jr 78
Ergotron
3840 Mac Tilt Classic 67
1274 Mac Tilt Platinum Plus 67
1273 Mac Tilt SE 67
Kensington
2539 Mac II Stand (No Cables) 19
3353 Macintosh II Monitor Stand ...64
3354 Mac IIcx Monitor Stand 54
2975 Super Base 31
2976 Tilt Swivel For SE Or SE/30 ...21
3355 Universal Copy Stand 22
2977 Universal Printer Stand 15

Part # Description Price

COMPUTER COVERS

Basic Needs
103 Cover Apple Imagewriter II ...11
107 Cover Hp Deskjet/Dskwrit. ...11
108 Cover Hp Laserprinter II/III ...15
100 Cover II/X/Fx Mon Ext Kb 17
105 Cover Imagewriter Lq 15
106 Cover Laserwriter II Sc/Nt/Ntx ...17
44 Cover Mac Classic With Lc ...16
89 Cover Mac IIcx/Ci Mon Ext ...17
102 Cover Mac IIsi Mon Ext Kb ...17
104 Cover Mac Lc Mon Lc Kb 17
58 Cover Mac Plus W/Plus Kb ...16
130 Cover Mac SE W/Std Kb 16
132 Cover SE E/Ext Kb 16
124 Hardtop Apple Imagewrtr. II 15
123 Hardtop Datadesk 101 Kb ...16
113 Hardtop Mac Ext Keyboard ...16
110 Hardtop Mac Lc Keyboard ...15
109 Hardtop Mac Plus Keybd 15
111 Hardtop Mac Std Keybd 15
127 Utility Pac 15
Kensington
2979 Apple Security Kit System 32
2978 Dust Cover SE Ext. Keybd 9
3361 Dust Cover SE Std. Keybd 9
3362 Imagewriter II Dust Cover 9
329 Keyboard Shelf Comp Mac ...39
330 Keyboard Slideaway 34
449 Polarizing Filter 32
448 System Saver Mac Fan 62
Smack A Mac
3756 Cover 13" Mon & Ext Kb 18
3754 Cover SE/Plus Ext. Keybd 17
3755 Cover SE/Plus Std. Keybd 17

MOUSE PADS

Mac Tech Distributors
3253 Maczone Thankyou Pad 6
Presicion
1306 Mouse Pad - Blk 6
1305 Mouse Pad - Blue 6
1307 Mouse Pad - Gray 6
1308 Mouse Pad - Red 6

STORAGE MEDIA

Fuji
2657 10 Pk Ds/Dd 800 Fdisk 8
2658 10 Pk Ds/Hd 1.44 Fdisks 14.95
3090 10 Pk Rainbow Dd Disk 9
3096 10 Pk Rainbow Hd Disk 15
NEW 100 Pc Bulk Pk Ds/Dd Disk 70
Maxell
1578 60 Mb Backup Tape 19
2469 150 Backup Tape Cs600Xd 24
9095 Mf2-Dd 800K 3.5" Disks 11
9096 Mf2-Hd 1.4M 3.5" Disks 19
PLI
4039 Pli 4Mm Backup Tape 49
SyQuest, Inc.
2183 Syquest 44 Meg Cart. Unfo ...74
Sony Corporation
932 Od 2040 40 Mb Tape 19
3109 Qd600A Data Crtrdg. 60Mb 21
1158 10 Pack Ds/Dd 800K Disks 12
2192 10 Pk Ds/Hd 1.44Mb Disks 19
4003 3.5 Ds/Hd Replacement 1.5
938 50 Pk Ds/Dd 800K Disks 39
2193 50 Pk Ds/Hd 1.44Mb Disks 75

PRINTERS

Abaton
217 Laserscript Lx 1745
Costar
3275 Costar Label Writer 178
4065 Costar Labelwriter II 178
3618 Costar Organizer 198
Hewlett Packard
2677 Deskwriter (300 Dpi) Print 699
Kensington
3350 Printer Muffler 80 43
Kodak
3845 Diconix B&W Printer 398
Microtek
4047 True Laser Printer 1699
4081 Truelaser Drum 119
4080 Truelaser Toner 2/Pk 39
Orange Micro
1517 512K Adapter Kit Grappler ...26
3564 Grappler Plus 77
Texas Instruments
4096 Ti Ps 17 Laser Printer 1299

DESKTOP PUBLISHING

Aldus
3898 Design Team See Text 868
3223 Pagemaker 4 01 498
3461 Pre Print 328
3880 Personal Press 1.0 198
Altsys
349 Metamorphosis Prof 84
Broderbund
1015 Print Shop 34
Frame Technology
3582 Frame Maker 795
Letraset
1370 Readysetgo! 4 5 164
Multi-Ad
54 Multi Ad Search 115
Quark
3488 Quark Xpress 3.0 518
2437 Quarkstyle 188
Timeworks
3798 Publish It Easy 2 0 143
Ventura
3909 Ventura Publ For Mac 498
Inman Software
3910 Business Plan Toolkit 95

DCR SOFTWARE

Advanced Software

Part # Description Price

2847 Docucomp 88
Caere
120 Omnidraft-Mac 74
2158 Omnipage 2.1 494
OCR Systems
461 Readright For Macintosh ...329
Olduval
1390 Read It! Ocr 2.1 277
2433 Read It! Personal 2.1 168
Xerox
2197 Accutext V2.0 518

WORD PROCESSOR ADD-ONS

A Lasting Impression
3103 Resume Expert 47
3243 Resume Xprt - Cov Letters 47
Baseline
3941 Thunder 7 56
Delta Point
3984 Taste 83
Deneba
2155 Bigthesaurus 63
1129. Coach Professional 123
1127 Comment 2.0 63
Individual
432 Resume Maker 29
Microlytics
416 Elements Of Style 33
437 Inside Information 67
438 Random House Encyc. 67
1501 Wordfinder 33
Paragon Concepts
3479 Nisus 3.05 244
Personal Bibliographic
1892 Procite 195
Petroglyph
3944 Editorial Advisor 74
Power Up
3201 Letter Writer Plus 57
Preferred Software
2188 Vantage 1.5.1 50
Reference Software
3143 Grammatik Mac 2.0 59
System Network Architects
3452 Stylist 45
Spinnaker
433 The Resume Kit 25
Systems Integration
3894 Software Bridge Macintosh ...78
Tactic Software
3405 Magic Typist 49
WritingTools Group
3813 Correct Grammar 2.0 49

MODEM & FAXES

Abaton
2987 24/96 Faxmodem 110V 348
3186 24/96 Faxmodem 220V 348
Applied Engineering
3980 Lc 24/96 Sendfax Modem 245
3981 Lc 24/96 Sendfax V.42Bis 265
3670 Portbl. w/Mnp 5 & Sendfax 205
340 Modem 2400 External 174
341 Modem 2400 Internal 208
3666 Modem 2400 Mnp 5 Ext 195
3668 Modem 2400 Mnp 5 Int 235
3667 Mdm 2400 Mnp 5 Sd Fx Ext 235
3669 Mdm 2400 Mnp 5 Sd Fx Int 269
DataDesk
1462 Hyper Dialer 30
Dove Computer
3318 Dove Fax 24/96 294
3514 Dove Fax Plus 358
Everex Systems
2048 Emac Md 2400 Modem 175
Global Villiage
3883 Teleport ADB 2400 128
395 Teleport Fax 24/96 184
Hayes
451 Hayes Personal Modem 149
452 Hayes Ultra 96 Package 925
386 Smartcom II 3.2 83
Mac Tech Distributors
28 Lexus 2400Bps Mini Mdm ...95
Microcom
3615 Mac Modem V.32 Mnp 5 ...688
Practical
4035 Modem 9600 Sa-Mac 569
Prometheus
212 2400 M Plus W/Mnp 5 218
3311 Mnp 5 2400 II Intrl 245
3319 24/96 Fax Msr 294
3312 2400 Mini-M 118
3314 2400 SE Plus 245
3608 9600M Plus 698
3313 Travel Modem 204
62 Ultima 749
Relisys
256 Relisys Tefax W/Autotax 869
Solutions
3621 Faxgate Plus 1.1 238
Supra Corporation
4028 2400 Plus Macpac 239
2003 Modem 2400 Baud 118
3368 Modem 2400 Macpac 178
65 Modem 2400 Plus 179
Telebit
2554 T-2500 V42 Rel 6.01 1050
U.S. Robotics
9320 Courier Hst 14 4 Mdm Int ...598
3665 Courier Hst Dual Std V42 ...995
1057 Courier Hst Std V42 675

JOYSTICKS

Advanced Micro Devices
2740 Mousestick Joystick 512 64
2741 Mousestick Joystick ADB 78
Kraft
1990 Joystick (Premium III) ADB ...49
941 Joystick Quickstick 512 39

Part # Description Price

PERSONAL FINANCE

Intuit
2591 Quicken 1.5 37
Meca Ventures
33 Managing Your Money 4 0 109
Nolo Press
3781 For The Record 2.0 31
481 Will Maker 4 0 36
Proplus Software
2798 Wall Street Investor 395
Reality Technology
3769 Wealthbuilder 98
Softview
3079 Macintax 1040 1990 Tax 58
Teleware
3535 M.Y.O.B. 2.0 Myob 141
The Software Toolworks
3464 Dollars And Cents 5.0 62

TAPE BACKUP UNITS

Everex Systems
2161 Emac 150 Backup Drive 715
2047 Emac 60T Backup Drive 649

CD-ROM DRIVES

CD Technology
3767 Porta Dr. CD Rom Drive 648
NEC Home Electronics
76 Intersect Cdr-36 Battery Pk ...95
79 Intersect Cdr-73 CD-Rom ...659
77 Nec Cdr-36 w/Type Gallery ...475
PLI
3691 Pli Cd Rom Hd 775
Toshiba
3536 Cd Rom Drive Xm-3201A ...795

MAC TO DOS CONNECTIVITY

Datavis
39 Maclink Plus Pc 5.0 128
3111 Maclink Translators 97
Dayna Coporation
320 DaynaFile II 1.44 Mb Hd 3.5" 435
3891 Dos Mounter 2.0 53
2612 Daynafile 1.44Mg 3.5" Drive ...595
2609 Daynafile 360K 5.25" Drive ...445
2613 Daynafile Dual 360K/1.2Mg ...649
319 Daynafile II 1.2Mb 435
318 Daynafile II 360K Ld 5.25 ...435
Daystar Digital
2215 Lt 200 Mc Localtalk Board 295
2214 Lt 200 Pc Localtalk Board ...185
Fairfield Software
3992 Clear Access 350
FGM, Inc
809 Picture This 64
Insignia Solutions
3664 Access Pc 64
2506 Soft Pc 1.3 241
3982 Soft Pc Classic 125
3282 Soft Pc Ega/At 124
Orange Micro
1485 Mac 286 V3.0 (Sing Brd) 1078
3032 Mac 86 Co-Proc Card SE ...265
3562 Orange 386 16Mhz 1695
59 Orange Micro 386 20Mhz ...1831
230 Orange Peripherals Kit 149
Traveling Software
3975 Laplink Mac III 3.2 92
Wiker, Ritcker & Quinn
262 Reflection 3 + ...360

NETWORK MAIL/SERVER SW

Caravell
3886 Mac To Mac 5 Pack 164
Casady And Greene
2875 Ame 1-10 Users 848
2874 Ame 1-5 Users 584
2873 Ame Single User 158
Cayman Systems
3120 Gator Mail Q (10 Users) 365
CE Software
3138 Quickmail 2.2.3 207
3137 Quickmail 2.2.3 307
Gizmo Technologies
142 Send Express 2.0 - 2Pk 56
143 Send Express 2.01 5Pk 125
Microsoft
52 Mail 3.0 Mail Server 245
279 Mail 1-5 Usr V.3.0 268
On Technology
4048 Instant Update V2.0 2 User ...279
Solutions
254 Mail Maker 20 User Pack ...425
Technology Works
4029 Gracelan V.2.0 50 User 299

OPTICAL DRIVES

Mass Microsystems
177 Mo 512 Optical Read/Write ...2899
PLI
2851 Pli Infinity Optical 600 Mb Hd 3794
3686 Pli Optical Cartridge 235

NETWORK MANAGEMENT SW

Cayman Systems
3118 Gator Share Software 1350
CE Software
2689 In/Out (1-10 User) 199
Farallon
827 Phonenet Check Net 63
2483 Phonenet Liaison 3.0 258
423 Timbuktu 4 0 30 User Pk 1429
2418 Timbuktu Remote 122
2827 Timbuktu Remote Acc Pk ...844
422 Timbuktu V4.0 10 Pak 719
420 Timbuktu V4 0 Single User 129
1639 Traffic Watch 134
International Business Software
3918 Dataclub 10 Pack 525
3917 Dataclub V11 3 Pack 279
LaCie, Ltd.

Part # Description Price

3702 La Cie Serial Talk (Single) ...115
Microcom
3477 Carbon Copy Twin Pack 188
3285 Carboncopy Mac Single 116
Sitka/TOPS
3167 Tops 3.0 Network Mac 186
1089 Tops Netprint 2.0 114

NETWORK ACCESSORIES

Asante
3945 Asante 10T Mau 99
Dayna
2791 Daynatalk Connector 95
Farallon
955 Phonenet - Db-9 34
832 Phonenet - Din-8 32
828 Phonenet Din 8 (10 Pk) 197
831 Phonenet Repeater 309
826 Phonenet To Appletalk Adap ...8
2779 Pn-301 Phonenet Star Conctr ...17
2752 Remote Wakeup Modem 31
2751 Star Connector (10Pk) 125
3475 Star Connector En Pn 501 120
2179 Te 140 Modular Cable Kit 74
359 Te-114 Rj-11 Term. Resist. ...15
364 Te-145 Phone Quad Cable ...75
360 Te-154 1-5 Adaptor 11
365 Te-161 Rj-11 Modular Ext. 14' 5
366 Te-162 25' Rj-11 Ext. Cable ...7
361 Te-167 Rj-11 Connector 10 Pk ...4
367 Te-172 Rj-11 Wall Box 5
362 Te-244 Plenum Tp Cable ...250
363 Te-245 Plenum Quad 200
837 Te-346 Wiring Kit Harm. 74
3940 Te-347 Rj-11 Patch Panel ...295
836 Te-440 Passive Star Wiring ...74
199 Te-447 Rj-45 Patch Panel ...199
358 Te-455 Dual Rj-11/Rj-45 12
354 Te-472 Rj-45 Tele Wallbox 8
3366 Wiring Kit Punchdown Te445 ...62
Nuvotech
1225 Turbo Net - Db-9 19
1224 Turbo Net - Din-8 19
3340 Turbo Net 12 Pack Din-8 ...198
1929 Turbo Net St - Db-9 29
1918 Turbo Net St - Din-8 29
3341 Turbo Net St 12 Pk Din-8 ...278
1226 Turbo Net To AppleTalk Adap. 6
Sitka/TOPS
3364 Tops 3.0 Network Dos 3.5" 149
3363 Tops 3.0 Network Dos 5.25" ...149
3365 Tops Flashbox Mac Din-8 ...118
3429 Tops Flashcard 195
1844 Tops Repeater 118
1678 Tops Teleconnector - Db-9 21
2223 Tops Teleconnector - Din-8 21

MATH/STATISTICS SW

Abacus Concepts
70 Macspin 168
32 Statview II 278
66 Statview SEGraphics 198
71 Statview Student 63
69 Superanova Mac II 308
68 Superanova SE/Plus 308
Prescience
1382 Expressionist 2.07 78
3882 Theorist 1.1 250
Strategic
2498 Exstatix 1.2 218
Synergy
2006 Kaleidagraph 2.0 144
Tree Star
1357 Flexitrace 145
3987 Flexitrace/Flexigraph 225
Wolfram
3524 Mathematica Enh V.1.22 648

MAIL LIST/LABELS

Avery Labels
3552 Mac Label Pro - Software ...47
Kiwi Software
2917 Kiwienvelopes! 32
Preferred Software
3555 Direct Mail 50
Satori
3013 Bulk Mailer 3.2.3 74
1135 Bulk Mailer Plus 3.2.3 165
Synex
3142 Macenvelope 5.0 56
2805 Macenvelope Plus 2.0 158
Vertical Software
3371 Fast Envelope 1.0 42
3370 Fast Label 2.0 42
Williams And Macias
2420 Sticky Business 50
401 Sticky Business Plus 86

FONT UTILITIES

Adobe Systems
2870 Plus Pac For Type Mgr 108
3497 Type Manager 2.0 54
3280 Type Reunion 37
Ares Software
78 Fontmonger 62
Image Club
3320 Evolution 54

DISK DRIVES

Applied Engineering
3671 3 5" 800K Disk Drive 195
3672 3.5" Hd 1 44Mb Disk Drive 228
PLI
3687 Superfloppy 1.4 (1 4/800) ...448
2298 Turbofloppy 1 4 (1.4 Only) ...308

SECURITY

Kensington
3357 Laserwriter II Security Sys 32
3676 Pass Proof (Cx,Ci,) 70
3660 Pass Proof (For SE) 70
4085 Pass Proof For Mac II Si 70

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KENSINGTON HELPS TO MAKE YOU MORE PRODUCTIVE

PassProof

$70

PassProof offers total defense against unauthorized use of your Mac without inhibiting authorized use. It's safe and easy to use and unlike potentially dangerous encryption programs, your data is never altered or manipulated at any time. PassProof works with a simple and logical series of "Locks". Some are hardware, some are software— you decide which ones to use and when.

#03660

SPECIAL SAVINGS

Turbo Mouse ADB

$107

If you use a mouse, chances are you've come to swear by it. But here's a reason to give it up. Turbo Mouse. Because the ball is on top, you move only the ball not the whole mouse. Its automatic acceleration senses the speed at which you're working and moves the cursor further when you move faster. Roll the ball slowly for 200 CPI pin-point precision. Roll it quickly and you'll fly across even the biggest screen.

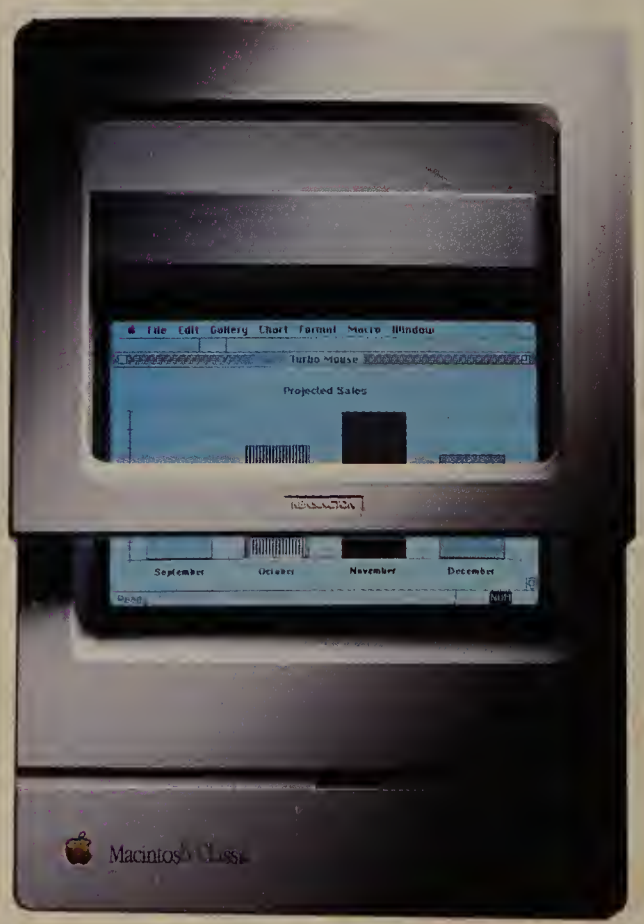
#01411

Antiglare Filters

$51

Put an end to eye strain, blurred vision, and headaches with our Maccessories Anti-Glare Filter. Made with a unique anti-glare, reflective coating, these Filters reduce glare reflected from you Mac's screen up to 96%. And they improve screen contrast and clarity up to 20% to eliminate the "fuzzy halo" that often appears around text and graphics. So even the tiniest numbers on a spreadsheet will be easier to read.

#03292



Power Trees

Kensington's PowerTrees organize your power with six outlets controlled by a convenient master switch. PowerTree protects your Mac against electrical power problems. Each provides a lighted master switch and size outlets protected against surges, dips, EMI and RFI line noise, plus an LED to indicate if the system is secure. If the circuitry fails, a buzzer sounds and the LED goes dark.

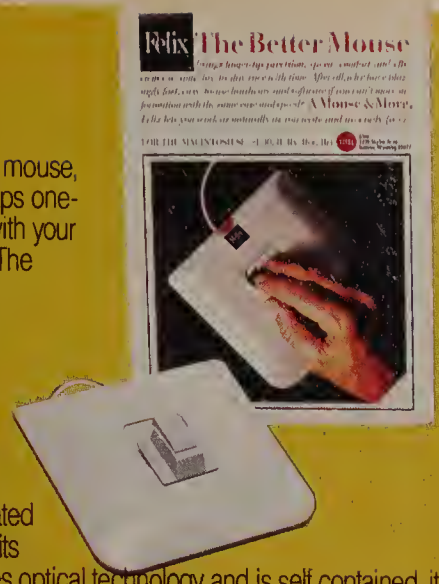
PowerTree 10	PowerTree 20	PowerTree 50
$19	$27	$54
#03339	#03342	#03343

KENSINGTON

NOW OPEN 24 HOURS A DAY — EVERYDAY

Altra Felix

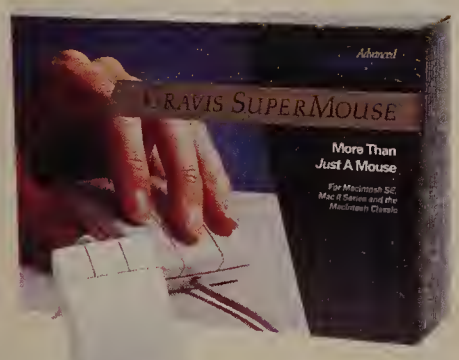
$116



Unlike a mouse, Felix maps one-to one with your screen. The arrow doesn't wander off into limbo. Felix automatically adjusts to your screen. No matter what the size or shape, it stays put so you won't have to search for it under papers. It's as comfortable to hold and use as a pencil. Felix lets you perform with all the speed of your sophisticated hardware and software because of its unique ergonomics. Since Felix uses optical technology and is self contained, it never needs routine maintenance. #02935

Gravis SuperMouse

$89



For productivity and performance, the three-button high resolution Gravis SuperMouse is more than JUST a mouse. It requires minimal desktop space. Its buttons access menu commands, tool palettes or macro programs (QuicKeys Lite included). Ideal for graphics, CAD, DTP and professional users. #00055

COMFORT AND PRODUCTIVITY IN A MOUSE

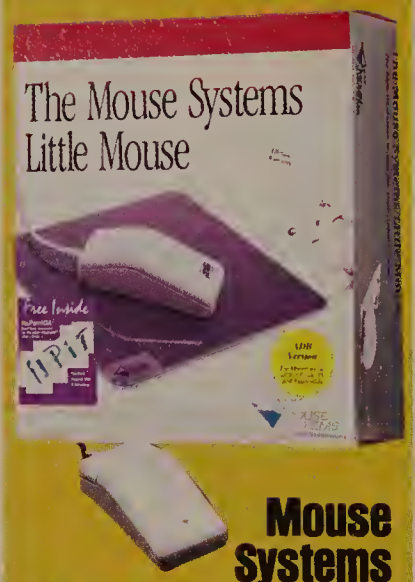
Logitech MouseMan

$76

The MouseMan family of mice lets Mac users choose the mouse that best meets their needs! Advanced ergonomics, high resolution and three buttons add up to more comfort and productivity than Mac users have seen before!

- Left- and right-handed version provide maximum comfort and ease of use
- Adjust resolution from 200 to 400 dpi for extra precision and speed
- Control Panel software makes it easy to program mouse buttons for keystrokes and shortcuts
- Perfect for use with Macintosh, A/UX and X-Windows Operating Systems. #04258

Mouse Systems Little Mouse for ADB



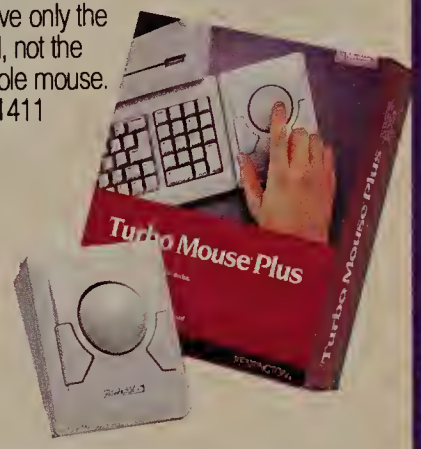
$74

Little Mouse ADB uses CMOS technology to make it the most maneuverable mouse for the Mac. Little Mouse is 22% smaller and 38% lighter than the standard Apple mouse. It's also 50% more accurate than any other Mac Mouse, because it offers 300 dpi resolution. It includes a precision mouse pad for smooth control. #03630

Kensington Turbo Mouse ADB

$107

Winner of the '87, '88 and '89 Macworld World Class Awards for Best Input Device. Turbo Mouse is quicker, more precise and easier to use than any other mouse. You move only the ball, not the whole mouse. #01411



MicroTouch Systems UnMouse

$159

The UnMouse is the intuitive touch tablet that lets you work both productively and creatively. To move the cursor, just slide your finger, over the glass and press to click. It's the fastest device around - especially in Absolute mode with one million touch points mapping precisely to the screen. Just point to a location on the tablet and instantly the cursor will appear in the, same location on the screen. And it's the only device that also works as a Power KeyPad with well-labeled templates which slide under the glass. Simply press down on a key to execute a command, macro or any combination of keystrokes, the keypad utility and blank templates are also included to allow you to customize your own templates. Or pick up the stylus and draw freehand, using the UnMouse as a mini-graphics tablet. #03412

Appoint Thumbelina

$69

Thumbelina is the ultimate tool for directing stand up computer presentations or MultiMedia exhibitions. Far superior to desk mounted trackballs or mice, its single handed, intuitive operation is unobtrusive - people focus on your presentation not your mouse. #04117

VERSATILE & CONVENIENT

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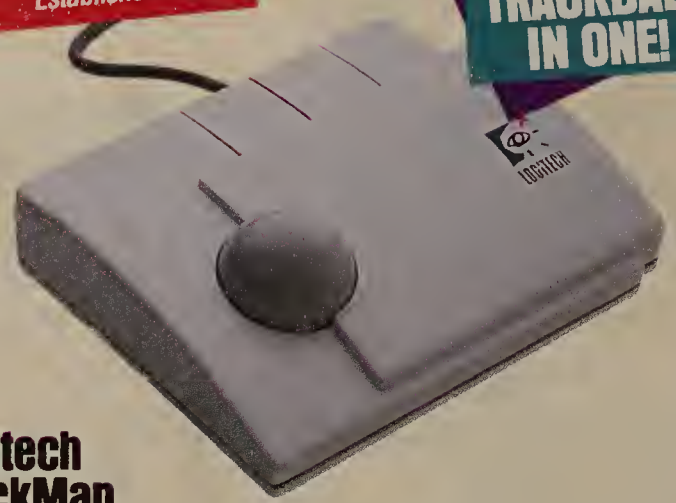
MAXIMUM FLEXIBILITY

A MOUSE & TRACKBALL IN ONE!



Logitech TrackMan

$88

TrackMan is the revolutionary new input device for Macintosh that combines the advantages of both a mouse and a trackball. With three buttons, TrackMan offers Macintosh users a range of flexibility they've never seen before!

- Thumb-operated ball for extra precision
- Hand-fitting design for ease of use and comfort
- Requires very little deskspace
- Adjust resolution from 150-300 dpi for extra precision or speed
- Control Panel software makes it easy to program buttons for keystrokes and shortcuts
- Perfect for use with Macintosh, A/UX and X-Windows Operating Systems

#00550

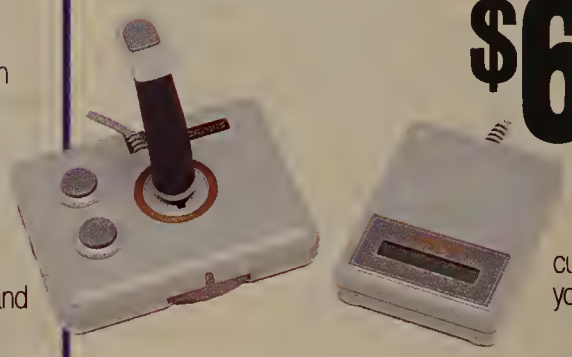
MicroSpeed MacTRAC 2.0

$74

MacTRAC 2.0 trackball from MicroSpeed with NEW Control Panel Software. User control of tracking and double click speed. Extra button commands and button combinations like "shift click" allow you to select multiple items, block out text and data, cut, paste or copy. Or use the edit feature to assign your own button commands.! #03305

Advanced Gravis MouseStick

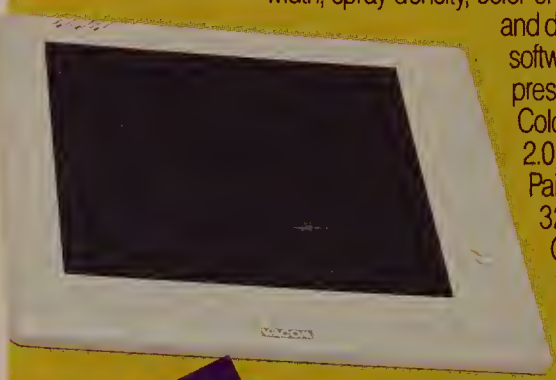
$64



For entertainment it's the high-scoring MouseStick. Its advanced optical technology and dedicated processing unit are ideal for flight simulators or mouse-intensive entertainment software. Includes custom settings for popular games— or you can create your own. #02740

Wacom Inc. Wacom 50 420 E 12x12 Tablet

$799



The Wacom Tablet has added a new dimension to the world of Macintosh graphics. Its cordless, pressure-sensitive stylus translates manual pressure into line width, spray density, color changes, or even "wetness" and dryout speed, depending on software. Now you can use pressure with Adobe Photoshop, ColorStudio 1.1, Digital Darkroom 2.0, Easy Color Paint 2.0, Pixel Paint Professional 2.0, Studio 32, SuperPaint 2.0, Time Arts Oasis and more. Use this feather-light stylus to paint, draw, trace, point, open, and close. #03677

DataDesk MAC-101EQ

$199

Successor to the best-selling MAC-101 keyboard, the MAC-101E is renown for tactile-feedback keys that give you the "touch and feel" for faster typing with fewer mistakes. Utilizes the extended 105-key layout with built-in function keytemplate system. Advanced ergonomic design includes color-delineated keys, Caps-Period lock and interchangeable Control and Caps-Lock keys. Compatible with every model Macintosh, includes a special offer for CE Software's new System 7 savvy Quickeys 2.1 leading macro program. MAC-101EQ is both the MAC-101E keyboard and Quickeys 2.1 macro software that includes the power of Apple Events. #04318

HIGH PERFORMANCE MOUSE ALTERNATIVE

Kurta Tablets

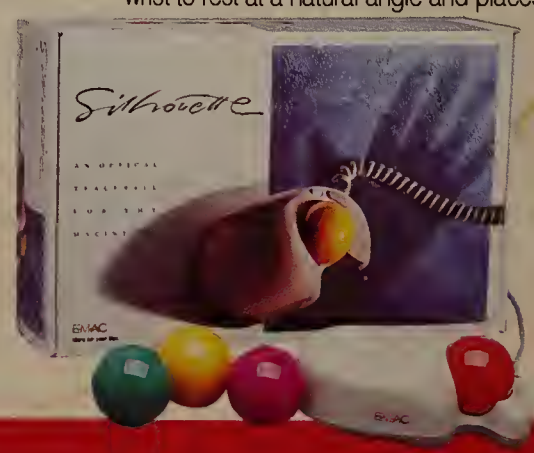
$318

Kurta's IS/ADB is a 200 dpi tablet that provides absolute positioning control, so you can create graphics quickly and easily. Its Menu Strip gives you 11 to 23 instant commands or macros. It's especially ideal for sketching, drafting, or freeform drawing. The Kurta Tablets work with most large screen monitors. Each tablet comes complete with the Cordless Cursor and cordless Pen for maximum flexibility and convenience. #03009

EMAC Silhoutte Trackball

$81

The radical EMAC Silhoutte trackball provides a comfortable mouse alternative that lessens fatigue and enhances performance. The Silhouette features a specially contoured chassis that allows your wrist to rest at a natural angle and places the ball at your fingertips for precision cursor control. Other features include four different weighted and colored balls, programmability, lock button with LED, CDev software, and two-year warranty. System 7.0. #04094



CALL US FOR EVERYDAY LOW PRICES!

Nylon Dust Covers

Basic Needs Nylon Dust Covers protect you computer and printer against dust and spills. They look great because they are machine-stitched and custom-fitted to your equipment. The platinum colored covers are made of washable, rip-stop nylon which is anti-static and won't crack, yellow or fade like similar priced vinyl.

#0044 Mac Classic w/LC KB $16
#00058 Mac Plus w/Plus KB $16
#00089 Mac IIcx/ci 13" Monitor Ext KB $17
#00130 Mac SE w/Std KB $16
#00127 Utility Pac $15

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STARTING AS LOW AS $15

Hard Top Keyboard Covers

Protect your keyboard from dust, major spills and falling objects. Hard plastic cover in attractive design. Fits easily over your keyboard.

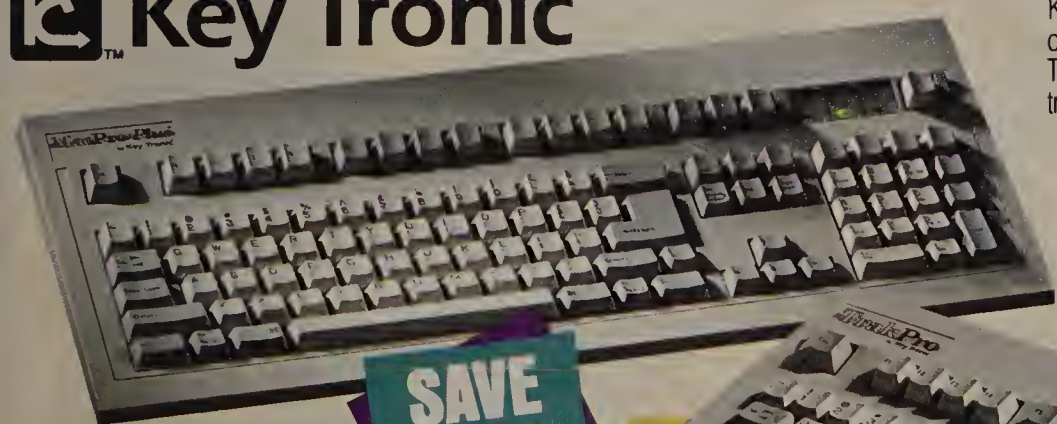
#0109 Mac Plus KB $15
#0110 Mac LC KB $15
#0111 Mac Standard KB $15
#0113 Mac Extended KB $16
#0123 DataDesk 101 KB $16
#0124 Apple Imagewriter II $15

BASIC NEEDS LINE LISTINGS

#00044 Cover Mac Classic w/LC KB $16
#00058 Cover Mac Plus w/Plus KB $16
#00089 Cover Mac IIcx/ci Mon Ext KB . . . $17
#00100 Cover II/X/FX Mon Ext KB $17
#00102 Cover Mac IIsi Mon Ext KB $17
#00103 Cover Apple Imagewriter II $11
#00104 Cover Mac LC Mon LC Keyboard $17
#00105 Cover Imagewriter LQ $15
#00106 Cover Laserwriter II SC/NT/NT . . . $17
#00107 Cover HP DeskJet/Deskwriter . . . $11
#00108 Cover HP LaserPrinter II/III $15
#00109 Hardtop Mac Plus Keyboard $15
#00110 Hardtop Mac LC Keyboard $15
#00111 Hardtop Mac Std. Keyboard $15
#00113 Hardtop Mac Ext. Keyboard $16
#00123 Hardtop Datadesk 101 Keyboard $16
#00124 Hardtop Apple Imagewriter II $15
#00127 Utility Pac $15
#00130 Cover Mac SE w/Std. KB $16
#00132 Cover SE E/Ext. KB $16
#00812 Monitor Stand for IIcx/ci $47

BRING POINT AND CLICK CONVENIENCE TO YOUR KEYBOARD

Key Tronic®



Key Tronic Corp. is offering $25 for most working Macintosh-compatible keyboards that owners send in after buying a Key Tronic Mac Pro Plus or Trak Pro keyboard. To be eligible for the trade-in offer, Macintosh owners need to purchase a Mac Pro Plus or Trak Pro keybaord between Aug. 6, and Dec. 31, 1991. Keyboard must be free from liquid spills, cracked enclosures and missing keycaps. The offer includes any ADB or RJ-11 compatible keyboard, but ADB models must include proper connecting cables. Purchasers simply send in their working keyboards to Key Tronic along with a trade-in certificate from participating dealers and proof of purchase.

SAVE $25!

NEW! TrakPro Keyboard

$209

Innovative design and a Limited Lifetime Warranty® make the TrakPro™ the most valuable input device for your Mac. The TrakPro features a 101-key layout similar to an Apple Extended keyboard, with the convenience of an integrated trackball. The ergonomic trackball design brings customized point-and-click convenience to your keyboard. Seven user-definable buttons with Control Panel software, a click-lock LED, and auto-acceleration provide optimal user efficiency. #00517

MacPro Plus Keyboard

No matter which Macintosh computer you use, Key Tronic's new Professional Series MacPro Plus is the keyboard for you. The 105-key layout is similar to the Apple® Extended keyboard, but gives you more. The MacPro Plus adds our first-ever Limited Lifetime Warranty*, and attractive price and new productivity features to give you everything you need in a keyboard. #02813

$144

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Avery MacLabel Pro

$47 Rely on Avery MacLabelPro Software to print professional-looking labels quickly and easily from your ImageWriter®, LaserWriter® or DeskWriter including: mailing labels, shipping labels, clear address labels and overhead transparencies. #03552

NEW!

Allsop Disk Files

$7 Conveniently preserve and organize your 3-1/2" disks with the Allsop Disk File Organizers which provide an efficient way of accessing and storing your 3-1/2" computer disks. The innovative design provides a built-in handle for easy transport, adjustable dividers for categorical filing, and specifically built with high-impact materials for maximum disk protection.

DF-30M holds 30 3-1/2" disks $7
DF-80M holds 80 3-1/2" disks $11

Maxell MF 200 800K

#09095 **$11**

Maxell MF2-HD 14

#09096 **$19**

Maxell's new Super RD (Reliable & Durable) MF2-HD sets new standards for floppy disks. Easily recognized by its unique black shutter, Maxell's MF2-HD has 10 patent pending innovations. These improvements have made the MF2-HD Maxell's highest performing and most reliable disk ever. Try it! Corporate, government and institutional buyers call our corporate sales staff for your quote today.

SAVE ON MAXELL QUALITY

Maxell 60mb BackUp Tape

#01578 ..... **$19**

Maxell 150 Backup Tape

#02469 ..... **$24**

I/O DESIGN CAN HELP YOU PROTECT YOUR MAC

Put your compact Macintosh into the Ultimate Classic/SE Extended carrying case and you can take it anywhere. This premium-quality case pampers and protects your Mac with its high density foam padding. The sturdy Du Pont Cordura Plus™ nylon exterior looks great and keeps the weight down. Inside, you will find a padded compartment for your keyboard (any model), mouse, external hard drive and cables. Two exterior pockets hold everything from manuals and floppy disks to sweaters and umbrellas. Now available in black, blue, and two hot new colors, Magenta and Aqua

Ultimate Classic/SE Extended Case **$74**
#03794

Ultimate Classic/SE Case **$68**
#03905

Ultimate LC Case **$94**
#00721

1. 9"x9"x3" padded pocket for mouse, cords and accessories. (Not on all models)
2. Padded flap separates hard disk from computer.
3. Padded handle for comfort; features Velco enclosure.
4. 2" Stiff nylon webbing maintains support.
5. Outer Handle assists in shoulder carrying.
6. 9"x12"x1" padded pocket for modem, disks and accessories.
7. Shoulder strap with slip-stop pad.
8. Flush side pocket.
9. ⅝" super high density foam padding for the "ultimate" in protection.
10. Heavy duty high tech hardware throughout.
11. Stress point cross & box stitched for added support.
12. Padded compartment fits any keyboard.
13. Lifetime Warranty.

ORDERS PLACED BY 9AM EASTERN TIME WILL SHIP THE NEXT DAY

Targus Premier Macintosh Case

$74

Premier Macintosh Case is perfect for the Mac SE and classic. Features a padded compartment for your Mac, external hard drive and removable padded case for the extended keyboard. Portfolio section provides Velcro-secured disk pockets, mouse and cable pockets and pen and business card holders. "Zilicone" treated Oxford nylon outer shell is water repellant, scuff resistant and won't wear against clothing. Removable shoulder strap with hand grips. Two layers impact absorbing foam. Rivets at stress points. Nonskid shock-absorbing rubber feet. Free running nylon zippers. PVC-backed materials throughout provide anti-static qualities. Padded exterior. Lifetime replacement warranty. Available in black, navy, burgundy and gray.

FEATURE PACKED

FreeSoft Co. White Knight

$84

White Knight is a powerful general-purpose tele-communications program that packs in almost every imaginable feature. It combines technical sophistication, flexibility and user-friendliness. The 270+ page user manual has plenty of tutorials to help beginners communicate like a pro in no time. White Knight is the winner of eleven awards including MacWorld's World Class Award every year from 1987-1991! #02881

CompuServe Mac Membership

$22

The largest on-line data service, with over 750,000 users. Services include electronic mail, bulletin boards, special interest groups (Forums) and a discount department store. You can read the stock data, weather forecasts, book and movie reviews. Mac users have three special interests. Forums and bulletin boards. The Membership Kit contains everything you need to get started including credit against your first two hours on-line. #00213

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Gizmo Technology Send Express

$56

Send Express is a Macintosh desk accessory that lets you transfer files, folders, personal notes, and Clipboard selections directly from your Macintosh to others in your AppleTalk network. It doesn't require a network server dedicated to file transfer processes. You can electronically send files and folders around your office. #00142

Software Ventures MicroPhone II 3.0

$214

MicroPhone II V. 3.0 delivers communications without the hassle. System 7 Compatible, it features a full range of protocols and terminal emulations, and contains a powerful scripting language for automating on-line tasks. Behind easy-to-use, graphical interfaces lies its unparalleled power. It includes predesigned front-ends that put you in touch with MCI Mail, CompuServe, Dow Jones, and other info services. That's why the NEW YORK TIMES wrote, "More than any other program.... MicroPhone II V. 3.0 shields the user from the complexity of computer communications," and Macworld magazine has just awarded MicroPhone II V. 3.0 the World Class Award for the second year in a row! Order now and you'll receive a free upgrade to 4.0 later this fall. #01902

Argosy Software Run PC

$139

Connect your Mac to an IBM PC compatible and run virtually any DOS program in a Mac window. DOS programs run on the PC, but are viewed and controlled with the Mac. Run programs at full speed, even programs using VGA graphics and extended/expanded memory. Includes Software Bridge/Mac for document translation. RunPC/Network connects any one of 10 macs to a PC via modem or AppleTalk network. RunPC/Remote connects a Mac to a PC via modem or the included serial cable. #04240

#04241 Run PC Network . . . $279

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Sitka Tops 3.0 Network

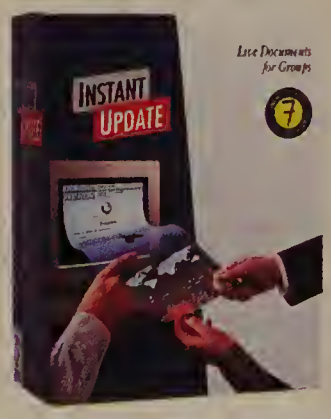
$186 TOPS 3.0 provides a complete network/E-mail solution for any combination of Macs, IBM PCs, and Sun Workstations. Every computer is a server and each user decides which files are public or private. It follows AppleTalk File Protocol so AFP-compatible multi-user applications will run properly. Includes TOPS Spool for background printing on the network, and a 20-user package of InBox 3.0. #03167

Gizmo Technologies ShadowWriter V. 1.0

$127 ShadowWriter is the latest software product that allows low-cost personal printers to be shared by all the Macs on a network. It installs in minutes to transform an inexpensive solo printer (e.g. the Personal LaserWriter LS) into a shared printer that any Mac on an AppleTalk-compatible network can use. It's Gizmo's second product offering in a planned series of low-cost network "gizmos" for Macintosh computers. #04159

ON TECHNOLOGY

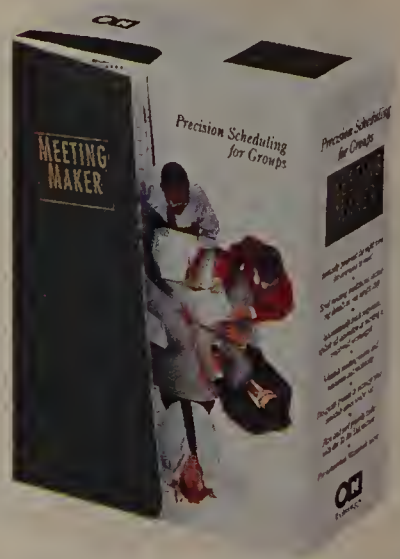
Instant Update



$279 With Instant Update, your group works together on virtually anything that needs joint effort. You don't have the headaches of printing, copying, distributing, waiting, chasing down, editing, re-printing, and re-distributing all of your work; or the constant interruption of meetings and e-mail notifications. From proposals to to-do lists and creative brainstorms to activity reports, Instant Update means that you've got the latest information whether you read it at nine in the morning or five in the afternoon. #04048

Meeting Maker

$314 MeetingMaker™ is a Macintosh network application that helps you plan, schedule and confirm meetings. You can schedule a time and date, select required guests, reserve rooms and resources and prepare agendas. Meeting Maker also has a personal calendar that allows you to block out activities, meetings, private work sessions, even recurring weekly or monthly appointments in a single step. You can also print your calendar in popular day-planner formats. #04009



PHAROS TECHNOLOGIES

Status* Mac

STATUS*Mac 2.0 is the most complete, flexible system ever designed for remotely gathering comprehensive information about all hardware and software associated with every Mac on your network. You can easily perform network-wide inventories, asset tracking, troubleshooting and software license compliance verification. Contains the exclusive System 7 readiness kit. The kit can make your work group transition fast, simple and complete. #04157

$299

#04267 Status Mac Smallnet (25 node license) **$309**

#04158 Status Mac 2.0 Unlimited (unlimited node license) **$799**

International Business Software DataClub 3 Pak

$279 DataClub is an amazing breakthrough in file server software offering real, tangible advantages over conventional, file server systems. Its Virtual Server creates a single, shared disk which is centrally managed and maintained. By utilizing the combined resources of the network (available disk storage and server processing) DataClub provides centralized server access and unlimited expandability, yet requires no dedicated hardware. #03917

DataClub 10 Pak

$525 #03918

Tactic Software MasterFinder

$49

MasterFinder is the complete disk management utility. MasterFinder allows for the complete control and manipulation of files and folders on any hard drive or floppy disk. It's a total replacement for the Mac Finder. Using a concept of window panes as its basic user interface, each pane displays file names from a directory of a mounted drive. MasterFinder's start-up view, the Pane View, consists of four panes that can display information on all mounted drives. #00148

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BEST VALUE

QuickMail 10 User Pak

$307

QuickMail is a flexible, expandable LocalTalk based electronic mail system. It does all the things E-mail should do - plus it has gateways to the outside world of MCI Mail, telex services, and dial-up services. The new Version 2.2 adds a store and forward feature, and a Conference screen opens instantly when you want to talk to several people simultaneously. #03137

Technology Works GraceLan 2.0

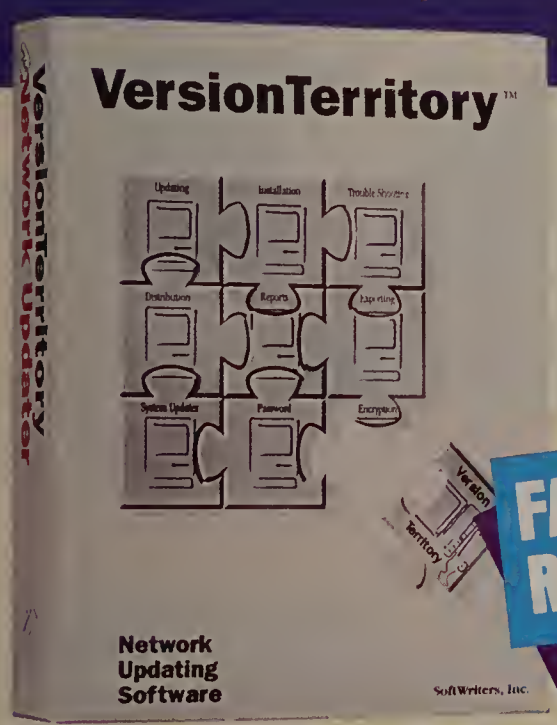
$299

Technology Works' GraceLAN network management software lets you scan and profile every Macintosh, printer, PC monitor, NuBus Card, network peripheral or SCSI device on any size network - without leaving your desk! Now GraceLAN ver. 2.0 has added security, more detailed information and enhanced exporting capabilities with templates for Filemaker and Excel.

GraceLAN ver. 2.0 is System 7.0 compatible, featuring balloon help, migration help and System 7.0 specific information, making it a great tool for migrating to System 7.0. #04029

UPDATED VERSION

UPDATE YOUR MAC



FAST AND RELIABLE

SoftWriter's Version Territory

$339

With Version Territory you can perform the following updates easier, faster and more reliable than with any other update method! It Updates System 6.0.x to System 7.0, 6.0.x to System 6.0.x, AppleTalk Phase1 to Phase2, Desk Accessories in System Files, PageMaker, Excel, SAM, etc. Version Territory distributes documents, updates address books, installs startup documents, maintains consistent System Folders, distributes FONTs, and performs complicated installations easily. #04126

FGM, Inc. PICTure This™

MAKES CONVERTING FILES EASY

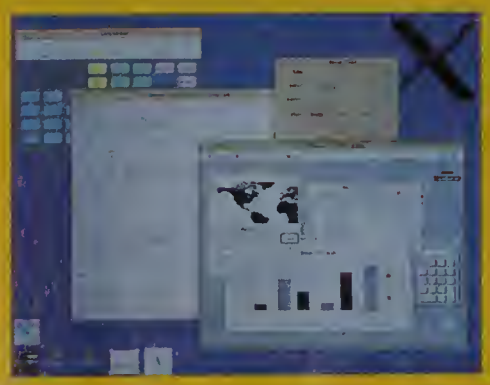
$64

PICTure This converts a wide range of graphic file formats to PICT/PICT2. Formats supported include CGM, PCX, Targa, TIFF, Sun Raster, CUT, X11Bitmap, and 12 others. Use the PICT files "as is," or edit them with your favorite paint/draw application. Users can save the converted PICT file into the Clipboard, then paste it into an application's document. PICTure This is ideal for projects in mixed hardware environments. #00809

Cayman Systems XGator

$349

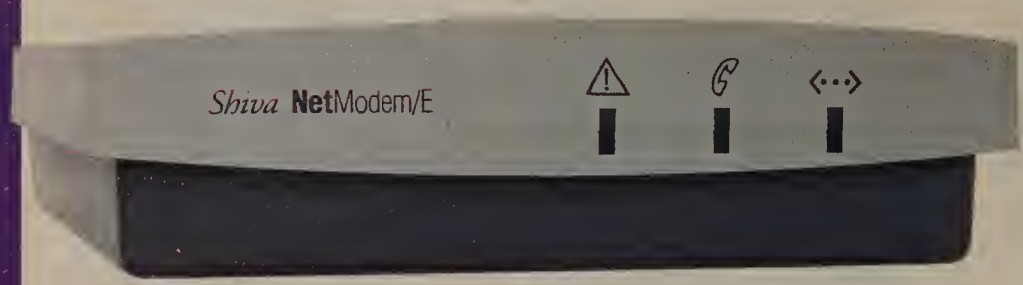
XGator turns the Apple Macintosh into an X Window System Client. Now X workstation or terminal users can execute Macintosh O/S applications from their computer. With the wide variety of low-cost graphic, word processing and CAD applications available for the Macintosh, XGator vastly extends the applications available for your X workstation. #00533



CALL 1•800•248•0800

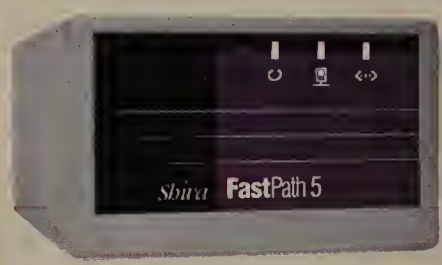
Shiva Corp. Net Modem E $1749

NetModem/E is a stand-alone Ethernet communications device designed to meet three LAN communications needs. It allows remote workstations to dial in and have full access to network services; lets LAN workstations call out to remote information services or hosts; and joins geographically separated networks in a routing connection over ordinary phone lines. NetModem/E supports Macintosh and PC computers on AppleTalk and Novell NetWare networks, NetModem/E switches automatically to accommodate Macs and PCs for each of the three application areas. #04129



Shiva Hublet

$299 Shiva Hublet is a stand-alone local concentrator for 10BaseT networks. It allows multiple nodes to connect to a single 10BaseT network drop. Hublet's four ports provide connections to Macintoshes, PCs, workstations or any 10BaseT device. #04156



Shiva FastPath V

$1899

Shiva FastPath 4 gateway allows Macintoshes on a LocalTalk network to access Ethernet network systems and services. It also allows Ethernet-based machines to access AppleTalk on a LocalTalk network. Everyone has company-wide access to printing, electronic mail and file servers. wherever they're located. #04038

INCLUDES DIAL-IN NETWORK ACCESS

Shiva Corp. Net Modem V.32

$1149 The NetModem V.32 is a 9600 bps modem that is designed to be shared over AppleTalk. The NetModem also includes Dial-In Network access software which allows a remote Mac or PC to dial into the network and use electronic mail, printers an other network resources. #03251

Orange Micro 386

$1695 The 386 is truly a second computer functioning independently inside your Macintosh. The dedicated 16 Mhz Intel 80386sx processor and 1 Mb of on-board RAM (expandable to 16Mb program execute with maximum compatibility. The Orange 386 is loaded with innovative features, including two PC/AT bus slots which allow you to add IBM PC cards inside your Macintosh. This capability opens the broad range of PC cards for the Mac. #03562

NuvoTech NuvoLink SC

$369

Plug the NuvoLink SC into the SCSI port of your Mac, and you can connect to an Ethernet LAN. The package includes AppleLAP Manager, an Ethernet compatible drive, installation software along with statistical and diagnostic software to help manage NuvoLink SC effectively. Front panel indicator shows Power On, configurations, diagnostics and network activity. #03115

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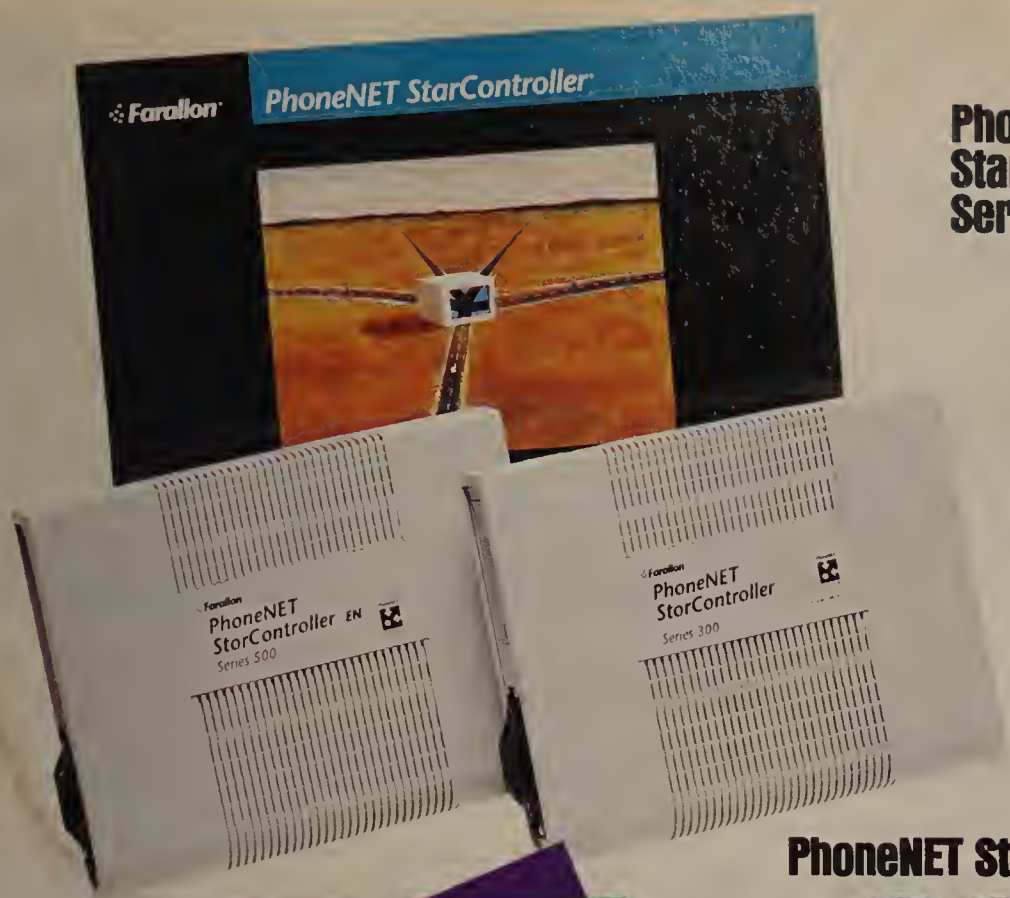

The Mac Zone
Established 1986

PhoneNET StarController EN Series 500

$1399

The StarController EN repeats Ethernet Signals over 12 ports and monitors network traffic and error rates. It's fully compliant with the 1EEE, 10BaseT standard, so it supports a variety of Ethernet devices from PCS th VAX mini-computers. It continuously checks the connection to each device, automatically shutting off unused ports to prevent disruptive signal error. StarCommand 2.0 management software, included with the PhoneNET StarController EN, continuously monitor your network as a background application running under MultiFinder. #03333

Now there is one word for EtherNET and LocalTalk! PhoneNET

PhoneNET StarController EN Series 300

$824

The StarController hub is a multiport LocalTalk repeater you mount in the telephone wiring closet. It connects all your network devices together in a star configuration, repeating and amplifying signals over existing telephone wire. Extend your network to as many as 48 locations. Easy-to-read LED display on the StarController give you a summary of traffic on each of the 12 ports and alert your to signal errors. Manage your LocalTalk and Ethernet Star Controller hubs from the same Macintosh. #00829

Farallon EtherNET Mac II Card

$299

The 10BASE-T compliant PhoneNET Card enables Macintosh SE/30 to Macintosh II family users to use the increased speed and bandwidth of EtherNET running over ordinary telephone wire. A built-in, 10BASE-T transceiver lets you attach twisted-pair telephone cable directly to your Macintosh— no extenal connector or transceiver is needed. The PhoneNETCard comes with timbuktu software. #03902

#03902	EtherNET Cards Mac II	$299
#03904	EtherNET Cards Mac II 10-Pack	$2699
#03901	EtherNET Cards SE/30	$299

Farallon Timbuktu 4.0

$129

This new version of the Eddy Award-winning software now supports color. It also prvides clipboard exchange and full background file transfer. Timbuktu is a versatile network application that allows you to observe or control another Macintosh over any AppleTalk network. With Timbuktu, multiple users can share multiple screens across the network— turning any software application into a team activity! #00420

Timbuktu 4.0 10 Pack	#00422	$699
Timbuktu 4.0 30 Pack	#00423	$1399

Farallon PhoneNET Talk

$129

PhoneNET Talk™ software (formerly AppleShare PC) is the affordable way to give MS-DOS and Microsoft Windows computers with networking cards access to high-quality laser printers, file servers, electronic mail, and other resources on AppleTalk networks. #00362

#03900 PhoneNet Manager's Pak $668

LAN ZONE

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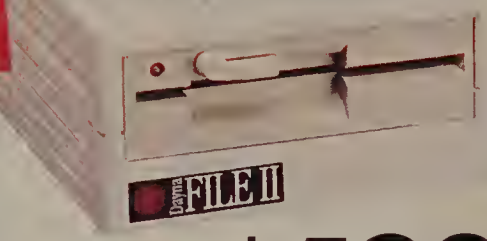


Dayna File II 1.2 Mb DOS Compatability

$429

Macintosh® computers are continuing to make their mark as a productivity tool in businessess that have been dominated by IBM® personal computers. More and more, Macintosh and PC users need to share the same information in spreadsheet, graphics and text files, without regard for the computer it was created on. For thousands of Macintosh users, the answer is a DaynaFILE™ disk drive. #00319

Dayna File II Dual Drive

#02616

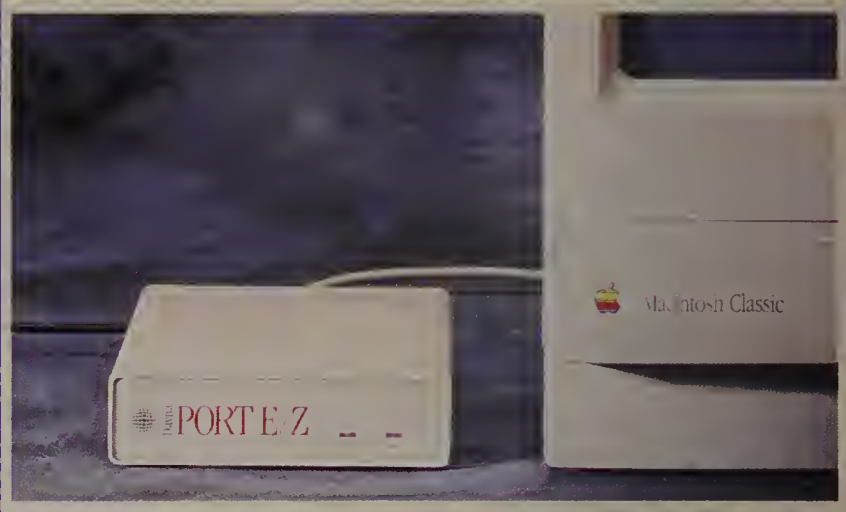
$799

Dayna DOS MOUNTER 2.0

$53

There are many disk drives that allow a Macintosh computer to read and write MS-DOS disks. Version 2.0 of DOS Mounter puts those disks on the desktop, just as if they were Macintosh disks. #03891

USES YOUR SERIAL PORT



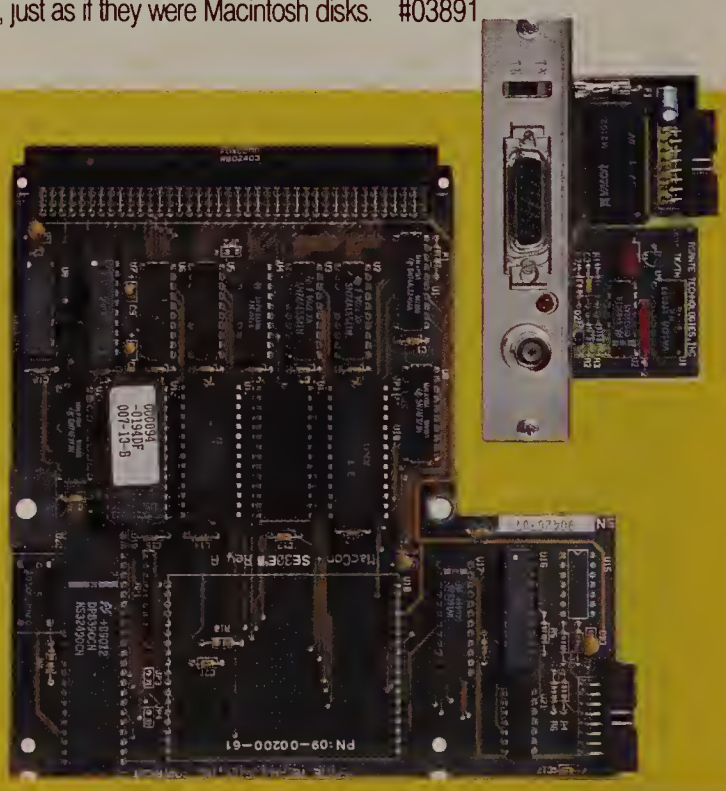
Dayna Daynaport E/Z

For compact Macs such as the Classic, Portable or Plus, or any Mac without a free card slot, we have the fastest and easiest Ethernet connection around. This external connector box plugs into the printer port and communicates at high-speed with the Macintosh processor. #00804

YOUR CHOICE

#04139 Daynaport E/Z-T
#00805 Daynaport E/SEsi
#00806 Daynaport E/LC
#03547 Daynaport E/SE
#03548 Daynaport E/II

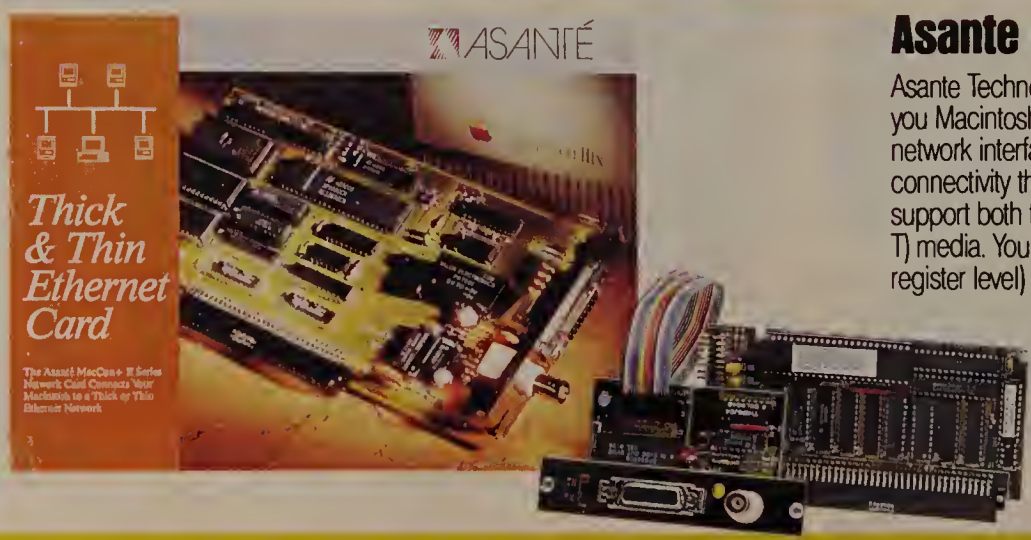
$264



Asante Ethernet Family

Asante Technologies' family of Ethernet solutions gives your Macintosh all the right connections. The MacCon+ network interface cards plug into your Mac to deliver high performance connectivity that's reliable and cost effective. #03885

THICK/THIN PRODUCTS			IO BASE T PRODUCTS		
#03641	MacCon+ II E	$269	#03885	10 Base T HUB	$689
#00221	MacCon+ II E64	$304	#03945	10T MAU	$99
#00020	MacCon+ 30iE	$269	#03643	MacCon+ II ET EN	$269
#03647	MacCon+ 30iE64	$304	#03642	MacCon+ II ET64	$304
#03648	MacCon+ SEE	$269	#03649	MacCon+ SE ET	$269
#00327	Asante EN/SC	$359	#03885	10-THUB	$699



Asante Mac Con +3I ET

$269

Asante Technologies family of Ethernet solutions gives you Macintosh all the right connections. Our MacCon+ network interface cards plug into you Mac to deliver high-performance connectivity that's reliable and cost-effective. MacCon+ ET Series cards support both thick (10 Base 5) and UTP (unshielded twisted pair 10 Base T) media. You get full compatibility with Applie's EtherTalk™ card (at the register level) which allows MacCon+ cards to serve in a wide variety of hardware and software environments. Plus, support for AppleShare®, TOPS, NetWare®, and 3+ Open™ is built in. And all MacCon ~ cards comply fully with the IEEE 802.3 Ethernet standard for thick (10 Base 5) and UTP (unshielded twisted pair) (10 Base T) media. #04031

#03646 Mac Con+ 30I E $269

WE WELCOME INSTITUTIONAL & GOVERNMENTAL P.O.'S

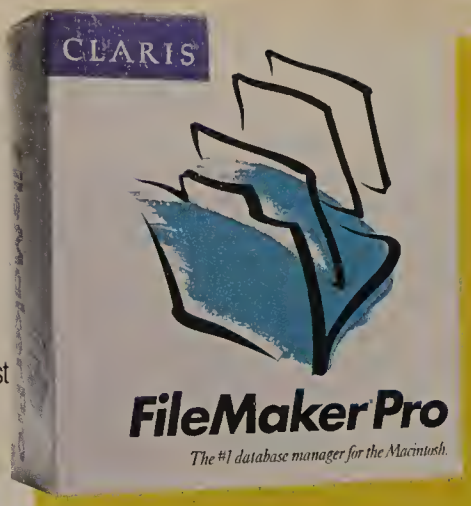
Jian BizPlanBuilder

$93 BizPlan Builder 4.0 gives you a structured framework for developing your own business or marketing plan. All you need is a word processor and a spreadsheet to edit the preformatted files and adapt them to your needs. It has 90 pages of outlines, headlines, partial sentences and paragraphs, tables with built-in tabs, lists, and financial statements. Helpful prompts ask questions and make suggestions. It's useful for making presentations to investors, senior executives, or clients. #04257

Odesta Corp. Double Helix

$429

Double Helix is the fastest multiuser database for the Macintosh. Fast, powerful, and reliable, Double Helix uses the Macintosh interface to its fullest and is the only completely object-oriented, non-procedural database for the Macintosh. Unlike fileservers, which slow your system down, the Double Helix client/server architecture keeps network traffic down and productivity up. In addition to speed, the advanced client/server format of Double Helix provides full referential integrity, giving each user immediate on-screen updated information. With Double Helix 3.5 you can create customized applications quickly without having to be a computer genius! #00609



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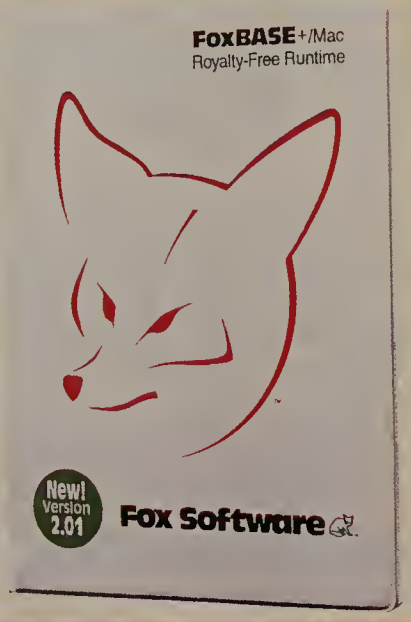
Claris FileMaker Pro

$214 FileMaker Pro is an extended flat file manager. Its look-up function extracts information from other files. The new graphics tools streamlines the generation of reports and layouts. User-definable buttons automate repetitive tasks or activate scripts. #03478

Fox Software FoxBasePlus Mac 2.01

$289 FoxBASE+/Mac runs all your dBASE programs on the Mac, without changing a single line of code. It has a proper Mac interface and the procedure language lets you create custom icons, user-defined buttons and multiple windows. The Form Generator simplifies the task of creating all those entry and report forms. The Application Generator automatically turns them into a custom application. #02581



REAL ESTATE SOFTWARE

Sales Dominator Ltd. Sales Dominator

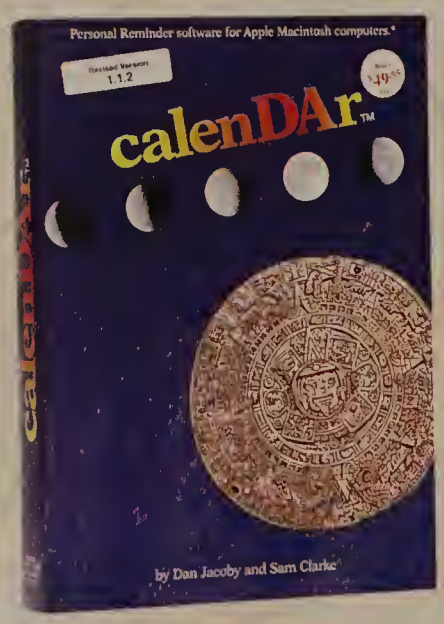
$495 Sales Dominator is a powerful real estate sales software system. It has 4 major modules integrated in to one "Hot Screen"

- Instant "Hot Info" on all clients!
- Dominator Word Processor- Built in!
- "New Mortgage Qualifier" for FHA, CONV., ARMS, VA.!
- Complete State-of-the-Art mailings, letter, postcards, merging!
- A "Time is Money" design approach for the real estate sales agent!

#04269

Palo Alto Software Business Plan ToolKit

$95 A practical toolkit for preparing a professional business plan with complete financial analysis, charts, sales forecasts and winning text. Includes complete sample plan and workbook. Received 4.5 mice from MacUser. Works with either Excel or Works. #03910



Psybron Software calenDAr

$24 calenDAr is a desk accessory calendar. This brilliant full color DA keeps track of all those things you want to be reminded about. Birthdays, anniversaries, schedules, appointments, things to do, important dates, etc. It reminds you as instructed, no matter what applications you are running. In addition to your own personal reminders, calenDAr keeps you posted about civil and religious holidays so that you avoid planning conflicts. #04268

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New Era Software nuBASE

$179

nuBASE is a full-featured relational database for the Macintosh. It provides a Graphical User Interface (GUI) that allows both the novice user and experienced developer to feel right at home. nuBASE provides information management solutions to all levels of business, regardless of database size. And best of all, it's fast and well documented. Users can create presentation quality entry screens and reports without programming, or may choose to custom design sophisticated applications using the advanced prodedural language.

Acius Inc. 4th Dimension 2.1.1

$488

4th DIMENSION is the ideal database for novice, intermediate and power users. It will keep pace with your needs with its automatic button scripting, multi-page layouts, superior relational strategies, streamlined data management amd easy-to-use procedures. Built-in Quick Report label generator, and graphing tool provide point and click data analysis and reporting. NEW! This version supports the 4th DIMENSION Environment including: 4D CALC, 4D WRITE and 4D COMPILER. Find out why 4D is the best selling relational database for the Mac. #02648

#03330	File Force	$199
#00411	4D Calc	$228
#03973	4D Write	$235

FOR YOUR OFFICE

The Microsoft Office

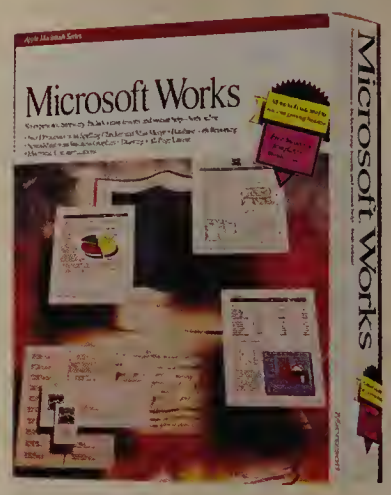
$519

Four essential business-productivity applications in one special edition. Each is an industry standard in its category: word processing, spreadsheet, desktop presentations, and electronic mail. Use Microsoft Word to write memos and reports: Microsoft Excel to crunch numbers and create annual-report-quality graphics; Microsoft Power Point program to create impressive presentations; and Microsoft Mail to instantly share information. #02678

Works 2.0

$183

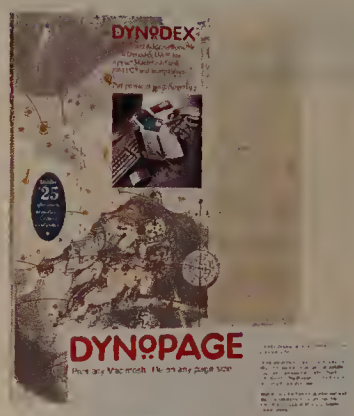
Microsoft Works 2.0 seamlessly integrates the five most-needed office applications; spreadsheet, database, word processor, desktop publishing with drawing and word processing documents. The drawing tools and linked columns of the desktop publishing section let you create professional style layouts. The Communications section makes E-mail and on-line work quick and easy. #00567



Portfolio Systems Dynodex 2.0

$71

Dynodex stores names, addresses, and phone numbers, and finds information fast. Print double-sided directly onto standard organizer-size paper. Works as a stand-alone program or a DA that lets you add, edit, and dial any entry. Comes with Dynodex paper. #00119



Portfolio Systems DynoPage

$72

DynoPage lets you print any Mac file on double-sided pages of any size. It prints spreadsheets, project lists, sales plans, pie charts, and other important documents on personal-organizer pages. #03977

Afterhours Software TouchBase

$88

TouchBASE is a database to keep track of personal and business contacts. It's handy all the time because it is a desk accessory. TouchBASE can print envelopes, labels, address books, fax cover sheets, and reports. It's even a mulit-user product so you can share your database on a network or use it all by yourself. #03908

THE WORLD'S BEST MAC PRODUCTS COMPANY

Foundation Solutions EPlanner 2.0

$159

EPlanner is a mid-range project planning and tracking application for corporate and private, hands-on project managers needing a simple yet robust tool for planning and tracking projects. EPlanner makes full use of the Mac interface for manipulation of Gantt charts, calendars, resource pools and chart symbols. EPlanner is intuitive to use and has complete on-line hyper-text help. #04196

MacProject II 2.5

$358

MacProject II brings structure and discipline to chaos. It helps you make decisions, set limits, and establish deadlines before you start. It tracks time, personnel, resources, and budgets, so projects don't turn out of control. MacProject II prints progress charts and reports for the entire team. Version 2.1 includes over 20 new features, such as Data Import/Export, and Resource Leveler, and On-Line Help. #04140

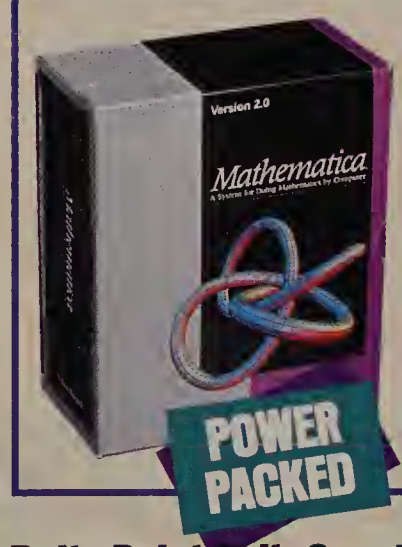
Total Access, Inc. Sales Max

$182

SalesMax is a 5 part program that improves your control of all Sales and Marketing. It allows you to set up multi companies or divisions. Whether you are one sales person working for many companies or one company with many divisions.... you can now keep full control. Never be at a loss for descriptions, terms, or pricings for special arrangements with your client. With a point and click you have the information you need. Complete product histories at your fingertips. Have a product list with bar codes in minutes. Fine tune your pricing for your specific needs. #03989

PRECISION MATHEMATICAL TOOL

Wolfram Research Mathematica Enhanced V. 2.0



$789

If numbers are your business, Mathematica can do numerical, symbolic and graphical computation. It can be used as an interactive calculation tool and programming language. Numerical capabilities include arbitrary precision, arithmetic and matrix manipulation. Mathematica 2.0 can manipulate formulas directly in algebraic form, performing such operations as symbolic equation solving, integration, differentiation and power series expansion. Produces two- and three-dimensional PostScript graphics. #04107

NEW INTEGRATED SOFTWARE FROM

Ragtime 3.1

$369

RagTime 3.1 is true integration for the Macintosh. It combines spreadsheets, text, picture import and graphing into one truly integrated package with every element editable on the same page. Hot links allow you to place references from the spreadsheet into the text and graphs in the same or other documents. RagTime automatically updates the links when the spreadsheet data is changed. RagTime is designed for total office integration with the ability to create live forms, price lists and mailmerges. #04055

Delta Point DeltaGraph

$128

DeltaGraph creates 22 types of charts and graphs (including seven 3D styles). Use the Data Notebook to import data (up to 10,000 points) in a spreadsheet format, and it will create the chart you want. Embellish your graph by importing EPS or PICT files. Or, you can use the drawing tools, which include Bezier curves, fill patterns (horizontal, vertical and radial) and full color controls. DeltaGraph lets you print your graphs on either QuickDraw or PostScript printers, plus plotter and film recorders. #03291

Informix WingZ

$244

Using WingZ is like having a spreadsheet with page layout and representation graphics all rolled into one. The program can place resizable graphics and text fields anywhere on the page. Its HyperScript programming language makes custom applications easy to create and use. #02224

INCLUDES HYPER SCRIPT

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Check Mark Software MultiLedger 2.0

$234 Now you can get General Ledger, Accounts Recievable, Accounts Payable and Inventory tracking all together in one completely integrated program. As easy to use as most one-write systems. But it's doing full double-entry accounting. Provides the internal controls and audit trails which are often missing from spreadsheet templates or database adaptions. Data entry is quick and easy. #02410

Meca Ventures Managing Your Money 4.0

$109 Managing Your Money is the most innovative personal finance package available for the Mac. It has six main parts. REMIND is a smart calendar. MONEY is the heart of the program. Here you'll record income and write checks. TAX keeps records and works with information that determines your final tax bill. PLAN helps you make rational plans for the future and figure out what various options will cost. INVEST helps you manage your investment portfolio. NET WORTH pulls information from the other modules to calculate what you're really worth. #00033

SAVE TIME & FRUSTRATION

Individual Training for Power Macros Excel

$33

INDIVIDUAL's PowerMacros™ For The Excel User

Individual's PowerMacros for the Excel User contains a collection of ready-to-use instructions and commands that can be executed with a simple keystroke combinations to save you time and frustration. Simply run the macro and you'll get step-by-step prompts and instructions. Features macros to: automate databases, exchange rows/columns of data, calculate statistics, automate charting, audit spreadsheets, generate tax tables, create invoices, plus over 120 more. #02195

An Indispensable Collection of Time-Saving Macros

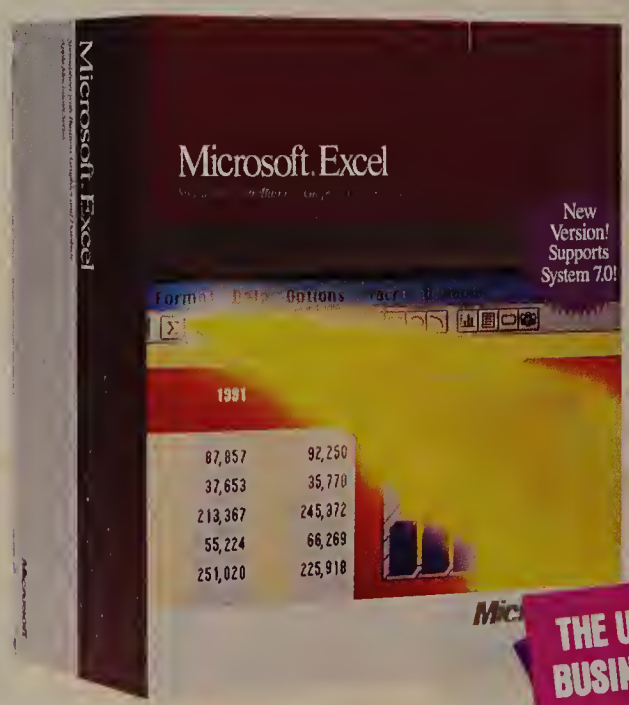
Macintosh Plus, SE, II

AN INDESPENSIBLE COLLECTION OF TIME-SAVING MACROS

BEST SELLING MAC SPREADSHEET

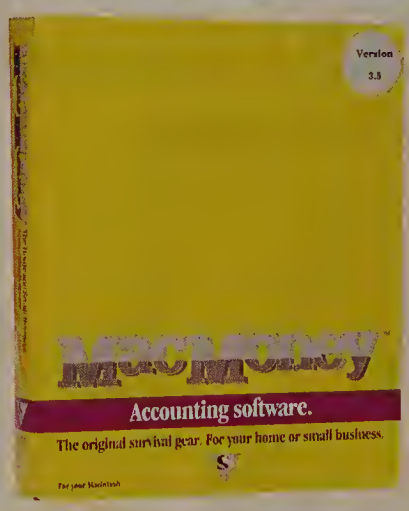
Microsoft Excel 3.0

$308 Microsoft Excel is the most advanced spreadsheet for the Mac. It combines a spreadsheet with business graphics and a database. It provides a worksheet area of 16,384 rows by 256 columns. Presentation tools, such as multiple fonts, variable row heights, shading, custom number formats, 68 built-in chart types and more, make Microsoft Excel the ultimate business tool. Excel has support from hundreds of other manufacturers' products and templates. Transfer Excel charts and worksheets into Word. Easy to update. #00227



THE ULTIMATE BUSINESS TOOL

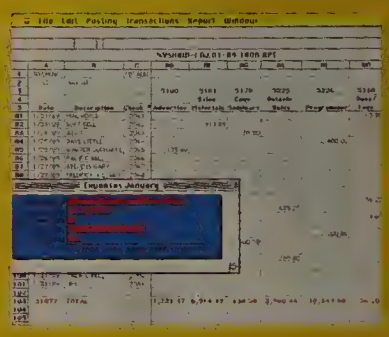
Survivor Software MacMoney



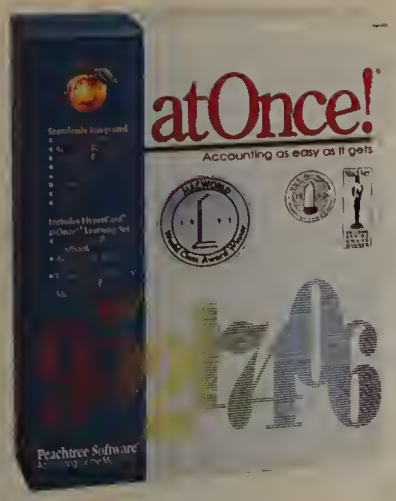
$58 MacMoney is a full double-entry personal and small business bookkeeping system and financial planning tool. MacMoney tracks expenses, bank accounts, credit cards, assets, liabilities, cash and income. You can create up to 250 accounting categories and divide transactions among as many as 8 categories. You can create automatic entries for recurring expenses, and there are extensive reports, as well as check printing. Winner of Macworld World Class Awards. #01582

Absolute Systems Computerized Classic Accounting

$223 Computerized Classic Accounting is the only accounting package that does accounting in the form and organization of manual books. Anyone who knows traditional manual accounting will feel at home with CCA. It allows for extremely fast data entry, print checks, invoices, W-2's, etc. and generates reports. Since all CCA's documents may also be opened using Excel, you can customize, analyze, create forecasts and graphs using actual data that CCA summarized, formatted, and organized during the accounting process. #03369

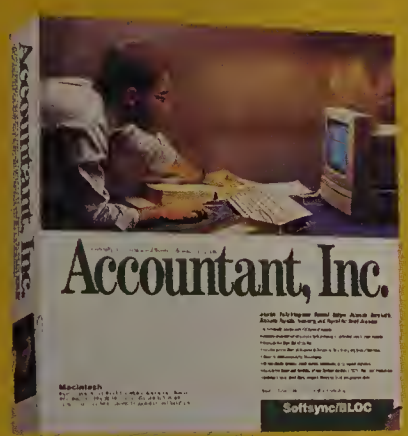


FREE SHIPPING ON ORDERS PLACED BETWEEN 9PM & 7AM EASTERN.



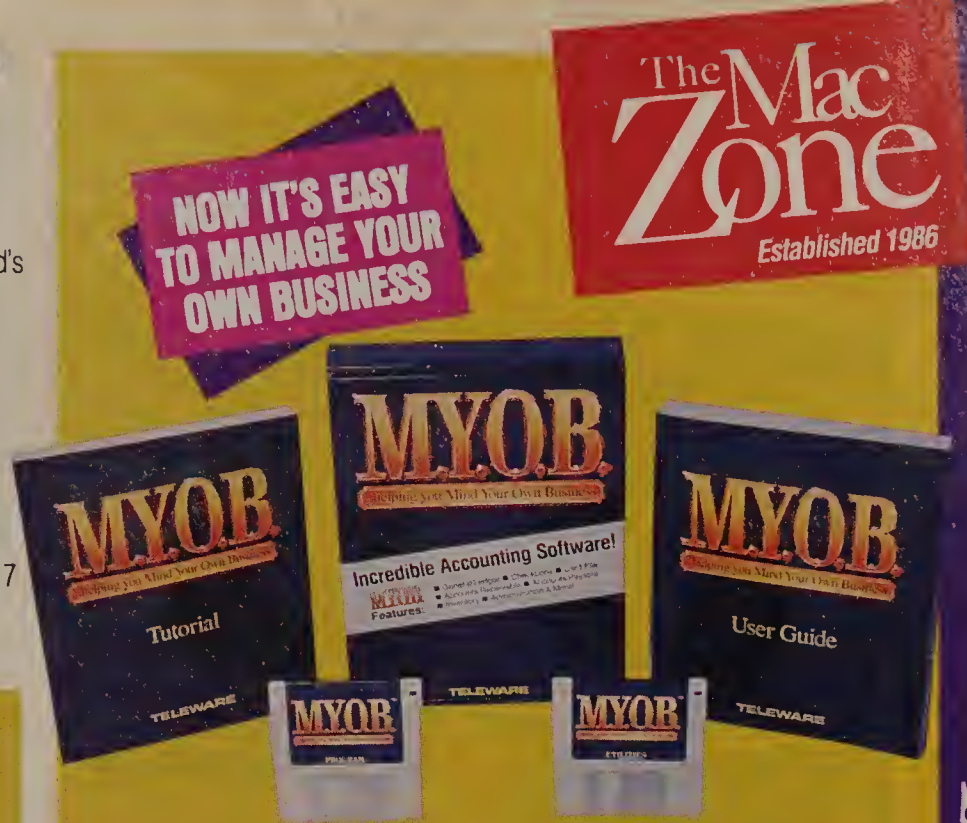
PeachTree Software AtOnce

$189 Winner of Macworld's 1990 & 1991 World Class Award and the MacUser 1989 Editor's Choice Award, atOnce! Includes General Ledger, A/R, A/P and Payroll. All four modules are seamlessly integrated, so that information entered into one module is automatically reflected in other modules. atOnce! provides on-line, context-sensitive help and a HyperCard tutorial for hands-on practice. Plus System 7 enhancements like Publish and Balloon Help atOnce! — Mac Accounting as Easy as it Gets! #02594



SoftSync/Block Accountant Inc. Pro V. 2.1

$338 Accountant, Inc. is perfect for any type of business - retail manufacturing, service or professional. It provides reports and performs analysis like no other software, so you can do what you do best and stop worrying about the accounting chores. Accountant, Inc. is a fully integrated accounting system. #03986



Teleware M.Y.O.B. 2.0

$139

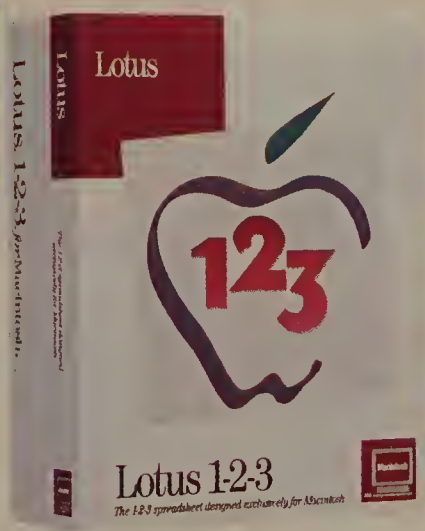
M.Y.O.B. combines a powerful, fully integrated accounting program with management tools you can't find anywhere else! With just a few clicks, you can control every facet of your business... print your financial reports, reconcile your checkbook, do invoicing, even call your customers. M.Y.O.B. is easy to learn and is simple to use, so it makes "doing the books" a breeze. Its unique graphic navigation moves you instantly through every part of the program. #03535

AWARD WINNER

Intuit Quicken 3.0

$47

New Quicken provides a more complete financial picture— it tracks checking, savings, credit cards, cash, assets, and liabilities. It keeps your records organized, accurate, and up-to-date. #04230



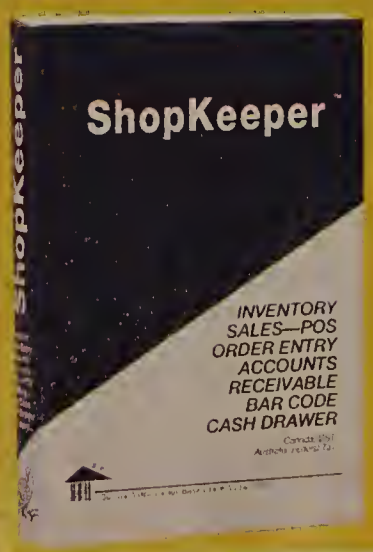
Lotus 1-2-3

$329 Completely redesigned for use on the Macintosh, this new product makes your work incredibly easy! Lotus 1-2-3 for Macintosh delivers innovative spreadsheet capabilities that provide users simple access to commonly used functions, the ability to customize the desktop to their work styles, and direct manipulation of text, graphs and objects for intuitive operations. It also provides full file, formatting, macro and keystroke compatibility with all versions of 1-2-3 using the menu invoked by hitting he "/" key. It will also fully support Apple's new System 7 operating system.

TimeSlips Co. TimeSlips III 2.0

$194 TimeSlips III for the Mac is the ultimate time tracking billing software system. With it you'll find that your workday is being spent more productively, and that your billings are much more complete. The features and functions are so simple, they practically run themselves. #02512

ShopKeeper 5.0



$249

Inventory and point-of-sale (POS) software. Order entry, accounts receivable, Bar Code & Cash Drawer control, auto billing, customer records, price schedules, custom forms, 5 inventory modes, reports, mail labels, custom forms, promos, auto vendor orders, General Ledger links, and dozens of other features. Used by over 300 different types of businesses— retailers, wholesalers, mfgr's, schools and local government #04111

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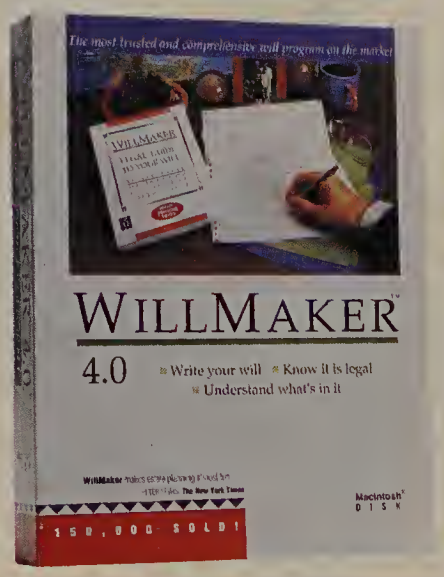
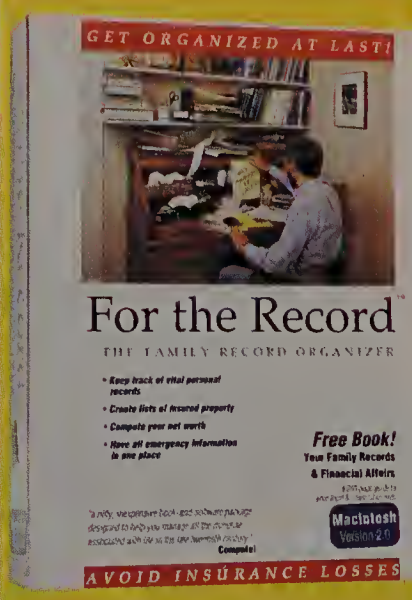
Nolo Press WillMaker 4.0

$36 Write your own valid will without ever calling a lawyer. Just answer the questions that WillMaker asks and the program constructs a personalized will with full legal standing. Now you can provide for your spouse, children, grandchildren, friends, or even your favorite charities. You can even create a trust for minor children. #00481



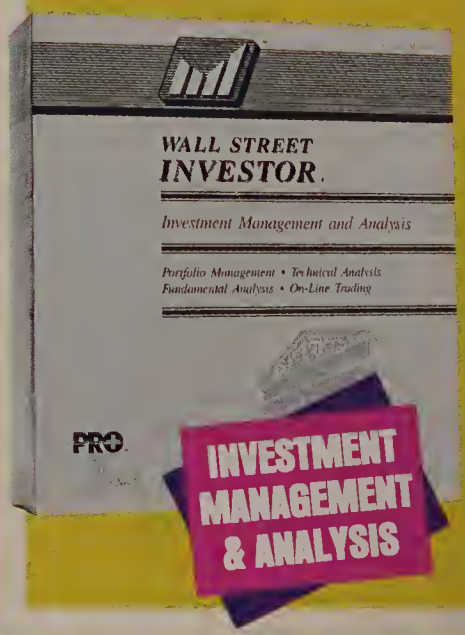


Nolo Press For the Record 2.0

$31 For the Record helps you keep track of all the important information in your life: credit card numbers, safe deposit boxes, emergency information, insurance policies, as well as a household inventory. It's both an estate planning and personal productivity tool. For the Record was cited by the San Jose Mercury News as a program "every family ought to have." #03781

Software ToolWorks Dollars & Sense

$62 Dollars and Sense has been a leading Macintosh program since 1984 because it eliminates drudgery. Your computer can generate checks, automatically record income and expenses, help balance your checkbook, and produce great-looking financial statements. At tax time your data will automatically be ready to prepare a return or to export to a tax program like Macintax. #03464



ProPlus Software Wall Street Investor 3.0

$395 The original Wall Street Investor handles portfolio management, technical analysis and on-line trading. Version 3.0 adds multi-account management, more reports, point and figure charts, real-time quotes, new trend studies, and adds data import-export capabilities. #02798

PROTECT YOUR HARD DISK

Kent Marsh Ltd. FolderBolt & NightWatch

Two powerful modular security systems to give you unsurpassed data protection. NightWatch is hard disk security. Protects your hard drive from unauthorized access by unlocking your hard drive only to approved users. Simply, it works like your bank teller machine card and is compatible with any Macintosh hard disk. FolderBolt provides powerful easy-to-use protection for Macintosh folders— it's fully integrated into the desktop. Just double click and it prompts for a password. Includes Read-only and drop folders, Administrator override, application copy-protection and System Folder security.

#01817 NightWatch **$84**

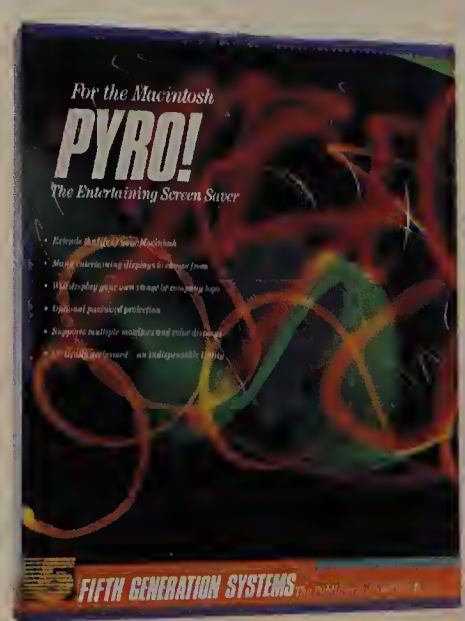
#00258 FolderBolt **$69**

Fifth Generation Pyro 4.0!

SAVE YOUR SCREEN

$24

Pyro belongs on every Mac to prevent screen damage. Images left on-screen for too long can burn a permanent image into the phosphors. Pyro automatically substitutes a variety of user-selectable graphic routines designed to keep damage from happening. Touch any key or nudge the mouse to bring the original display back. #02194



Dubl-Click ClickChange

$56

Your Mac comes alive! Colorful, 3-dimensional windows, buttons, scrollbars, and cursors are all just a click away. With ClickChange in the control panel, the Users' master of the "User Interface". You'll have control over your Mac's buttons, color, cursors, scrollbars, sounds, and windows. #03616

FREE SHIPPING ON ORDERS PLACED BETWEEN 6PM & 3AM PACIFIC TIME

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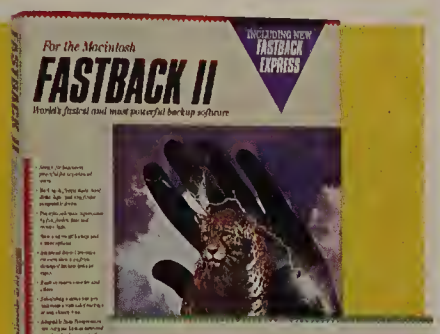
Fifth Generation Suitcase II 2.0

$48 Suitcase II expands your font and desk accessory menus, giving you access to as many as 255 items in each. Once Suitcase II is running, you can install and use any font, DA or FKEY just by using Suitcase II to bring it in. Its most delightful feature is its ability to autoload font/DA files at startup. When Suitcase II starts, it looks for files or folders named Fonts, DAs, and Fonts/DAs. If it finds any, it opens them automatically. #02002

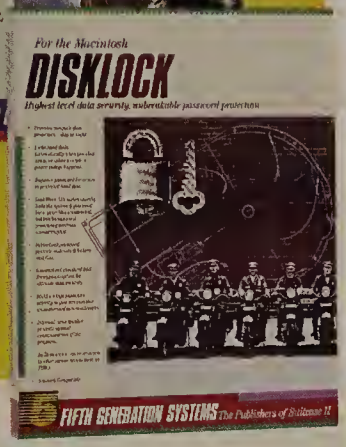
Fifth Generation FastBack II

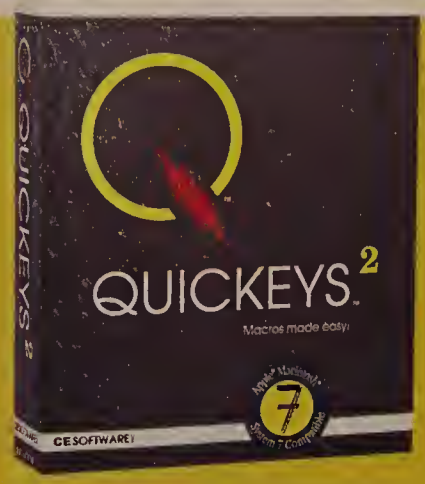
$117 FastBack II is a high-speed backup utility that allows a user to back up a hard disk at more than 1 MB per minute while simultaneously formatting the backup disks. #03826



Fifth Generation Disk Lock 2.0

$117 DiskLock offers the most sophisticated system available for restriction access to computer data. It delivers power, versatility, and flexibility, yet it's so elegantly easy to use, it's like second nature. #03727





CE Software QuickKeys V. 2.1

$93 QuicKeys 2 lets you make shortcuts for your Macintosh. Shortcuts that will make your Macintosh even easier to use and more fun. No matter what you want to do, QuicKeys 2 helps you do it better.

- Save your work every 10 minutes
- Print envelopes using a selected address
- Change the font, style or size of selected text
- Open an AppleShare volume
- Select a printer
- Back up your work at intervals
- Download, format and graph stock quotes #03771

CE Software Alarming Events

$83 Alarming Events is an affordable assistant that helps you track appointments, meetings, special events... never miss anything ever again! Just start making appointments. Tell Alarming Events the details; at the appropriate time, you get a notification screen telling you who, what, why, where and when. No matter what you (or your Macintosh) may be doing. #03624

Berkeley Systems More After Dark (M.A.D.) & After Dark Bundle

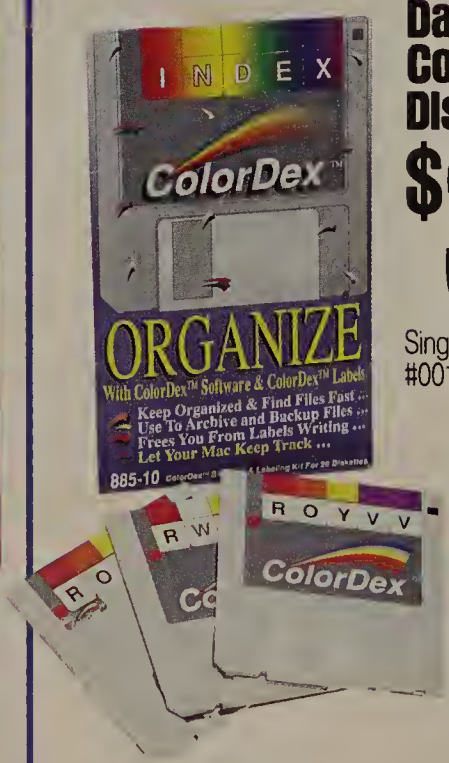
$41 It's M.A.D.! It's More After Dark— over 25 incredible new displays for After Dark, the Ultimate Screen Saver. Features contest winner Mowin' Man, Tunnel, GraphStat, and many beautiful new fish! Crazy Kittens, Art Museum, and Lunatic Fringe game module help save your screen from phosphor burn-in. Requires After Dark. #04046

#04053 More After Dark **$24**

After Dark

$28 Plus After Dark, the Ultimate Screen Saver Collection. Over 35 displays including classics Flying Toasters and Fish! With sound, password protection, logo and message display. #02785

UNIQUE COLOR CODING SYSTEM



Data Tree Co. ColorDex Disk Librarian

$35 Single Pack #00195

Ever had trouble finding an important file? ColorDex automatically keeps a detailed database of your floppy disks' contents, including files in Stuffit and compactor archives. Always available, ColorDex locates a file for you in seconds and then tells you the color code of the disk. It doesn't matter how many 'untitled' disks you have. ColorDex knows the disk by its unique color code. Any one of over 16,0000 possible color codes can be used to uniquely identify each disk. Labels included.

#00196 5 Pack **$85**

#00197 10 Pack **$125**

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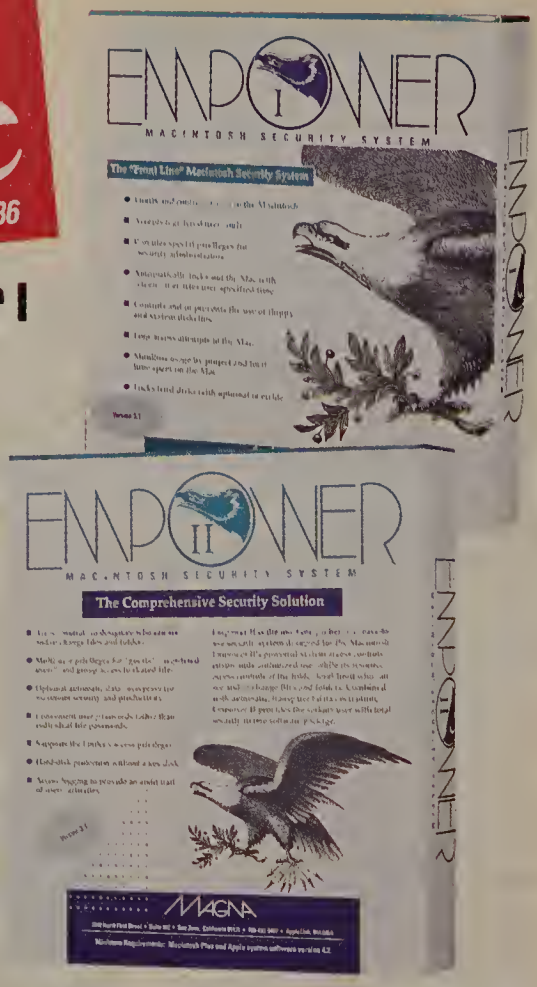
Magna Empower I

$88

Provides a "front line" defense to control and monitor use of the Mac. Screen lock-out preferences allow users to automatically or manually blank the screen to protect sensitive documents. Controls and/or prevents the use of floppy drives. Provides access logging and project tracking for auditing and monitoring use. Grants special privileges to security administrators. Offers optional encryption algorithms. #03406



$149

Magna Empower II

Provides all of the features found in Empower 1, plus resource access controls at the folder level which limit who can see and/or make changes to folders and files. Protects system and application folders. Allows for guest users, registered users, and group access to shared files. #03407

FIND YOUR LOST FILES

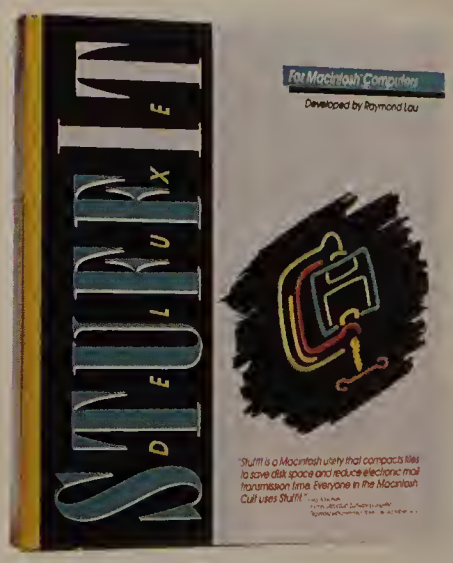
DATA RECOVERY
HARD DISK BACKUP
DISK OPTIMIZATION
FILE MANAGEMENT

Central Point Software

Central Point Software Mac Tools Deluxe

$78

Mac Tools provides utilities for data recovery, file protection, and disk management. You can make backups of your hard disk whether on Apple tape drive or a set of floppies. Other utilities in the collection undelete accidentally erased files, recover damaged files, compress files, defragment files, and encrypt them. A DA finds "lost" files fast. #04136



Aladdin Systems Stuffit Deluxe

$61

Stuffit Deluxe is the easy-to-use Macintosh standard for compression, encryption and archiving. Files can be compressed up to 98%, with 50% the average. Stuffit Deluxe comes with Finder Extension that makes compression as simple as clicking on any file, folder, or disk icon. Once compressed, files can be manipulated as needed. A MacUser 5 mice winner. FREE upgrade to 3.0 #03458

Gizmo Technologies Shadow Writer

$127

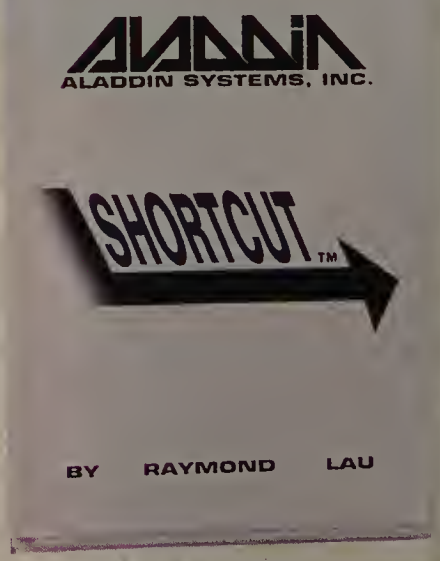
ShadowWriter is the latest software product that allows low-cost personal printers to be shared by all the Macs on a network. It installs in minutes to transform an inexpensive solo printer into a shared printer that any Mac on an AppleTalk-compatible network can use. Share your StyleWriter, Personal LaserWriter LS, Personal LaserWriter SC, or LaserWriter IISC on the network! #04159

BACK-UP YOUR MAC

Dantz Retrospect

$158

Whether you have a single Macintosh or a whole network of them, Retrospect is your complete backup and archiving solution. Automatic, unattended backup doesn't interfere with your daily activities. Archiving liberates valuable hard disk space by storing seldom used files on the backup medium. Supports all tape, optical, and removable cartridge media. Retrospect Remote allows backup for up to 10 networked Macintosh to a single storage device. #02586



Aladdin Systems Shortcut 1.5.2

$45

Shortcut is a disk management utility that appears in every program's Open and Save dialogs. There you can quickly jump between documents and folders or find lost files within seconds. When saving any document, Shortcut lets you create folders for your new work. And there's more - anything you need to do within an Open or Save, Shortcut is your utility. A MacUser 5 mice winner. #02986

MicroSpot MacPalette II

$54

Turn your ImageWriter II into a FULL COLOR printer - producing over 250,000 colors from just a four-color ribbon. This Chooser-level printer is easy to operate with on-line help dialog boxes. Also available is grayscale output using a black ribbon and scaling from 10 to 1000 percent. Compatible with any of the Macintosh II series, the Mac LC and the SE/30 and most Macintosh software. #00818

#04326 MacPallette II AppleTalk $169

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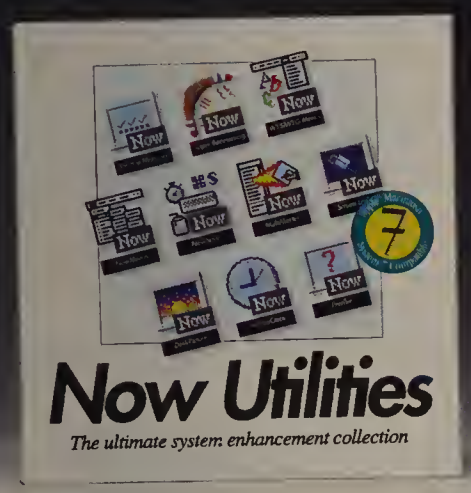
Now Software Now Utilities

$84

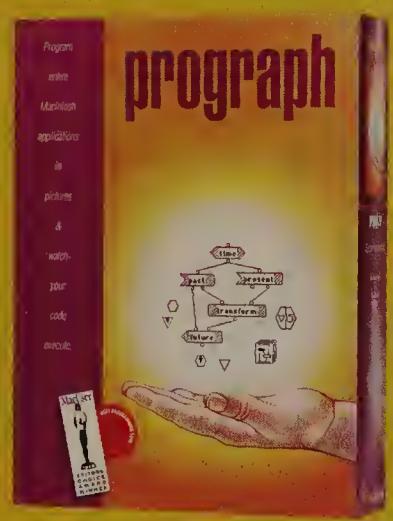
According to MacUser, "Now Utilities is a must-have for experienced users and novice users alike." Included in the collection are: Super Boomerang, rated as the best of the Open & Save dialog box enhancers; StartUp Manager, the most powerful extension manager; and WYSIWYG Menus, which groups font familes together in their own typeface. Plus: NowSave, Screen Locker, AlarmsClock, Profiler, MultiMaster, DeskPicture, and NowMenus! All components are System 7 compatible. #04191



TGS Systems Prograph 2.5

$299

New version with database engine and System 7.0 Support. Prograph's powerful Visual Programming Environment is the fast and fun way to program the Mac. You can construct stand-alone applications without typing any code, and create user interfaces as fast as you can draw them. The new database engine lets you create multi-user, multiple table database applications that support multiple indices and arbitrary data types. Add-ons are available directly from TGS Systems for DAL (networked SQL) and Oracle databases, and for linking Pascal, C or FORTRAN libraries. #04253

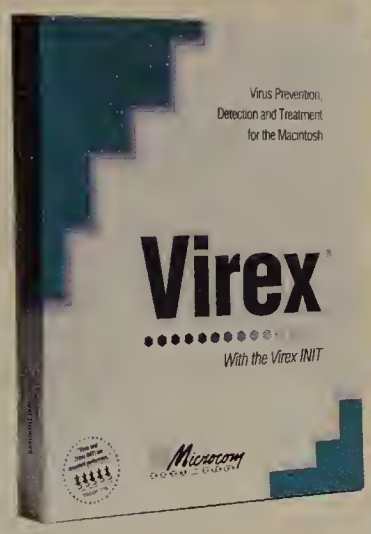


Serius Programmer

$210

If you're a typical Macintosh user, you'd love to create your own custom software quickly and easily but couldn't because you're not a programmer. Now you can! Built around Serius Programmer's revolutionary information control system, Object Interaction Protocol (OIP), Programmer's tools offer a variety of advantages over conventional development systems. Every custom application can use the full array of Macintosh graphic controls including windows, menus, buttons, lists and others. You'll have complete control over the look and feel of your new application. When you finish designing it on screen, programmers will compile and save your work as a stand-alone application which can be used by anyone. #03409

FOR TOTAL PROTECTION



Microcom Software Virex

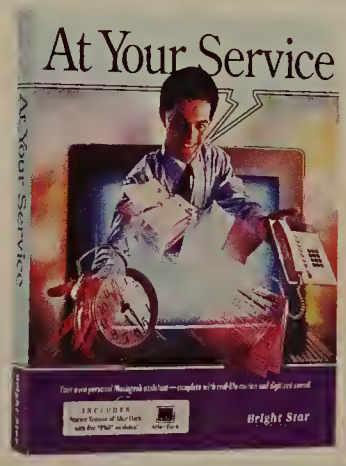
$56

Virex® is a comprehensive solution to the threat of Macintosh computer viruses. It detects the presence of computer viruses and repairs files infected by all known Macintosh viruses. Once a system is disinfected the Virex INIT continuously monitors the computer so that virus infections are prevented. #02077

BrightStar At Your Service

$30

Phil will notify you of important meetings, prompt you when phone calls need to be made and remind you when deadlines approach. He'll alert you when E-mail arrives, provide a report on your computer's memory usage and system and monitor keyboard and mouse activity to suggest when you need a break. #00415

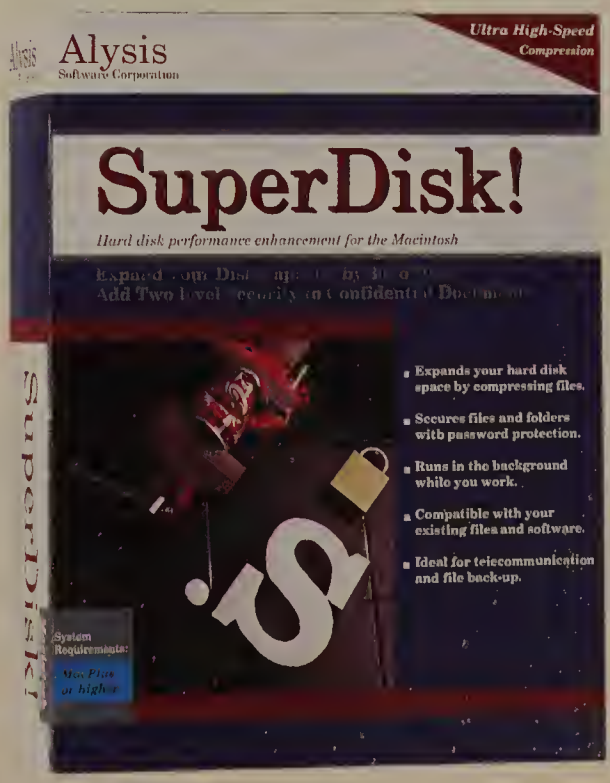


COMPRESS YOUR STORAGE PROBLEMS AWAY!

Alysis SuperDisk

$59

SuperDisk is a system enhancement that effectively enlarges your hard disk through ultra-high-speed compression. Once it is installed, SuperDisk compresses and decompresses applications and data files automatically - transparently enlarging your hard disk. It offers the highest throughput and the greatest compatibility of any compression option available for the Macintosh. SuperDisk is the ONLY compression product that works with programs like Disinfectant Virex™, On-Location™ and with files like control panels, INITs and desk accessories. It creates auto-expanding files and secures compressed files with two levels of password protection. #00512



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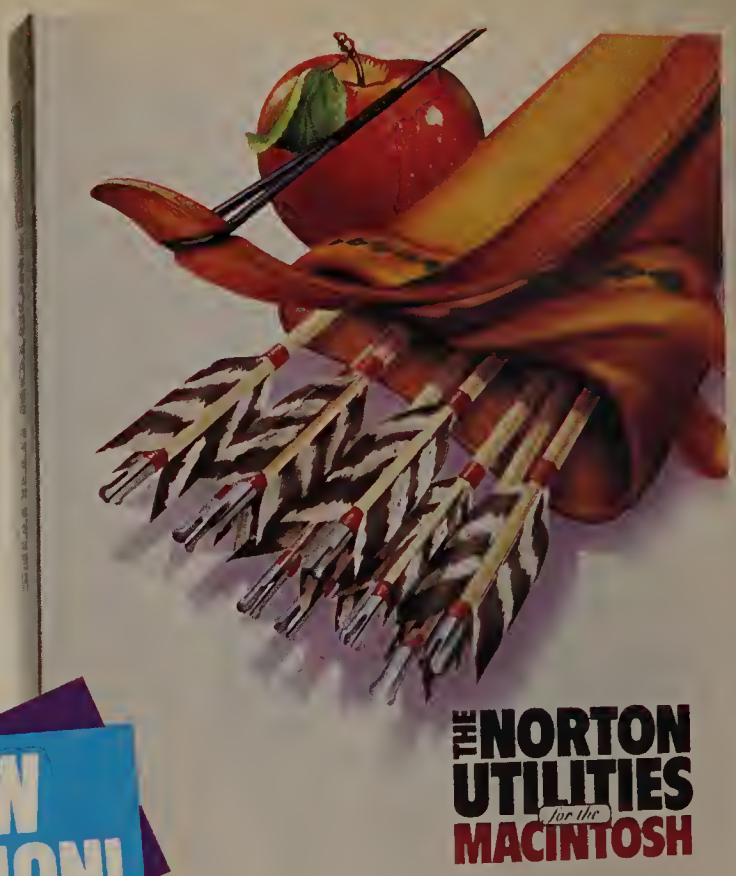
Symantec The Norton Utilities

$83

Norton Utilities for the Mac gives you an unbeatable combination of disk and data recovery software, along with disk optimization utilities. Now you can keep your valuable disks and data safe, secure and operating smoothly. It provides three levels of unerase, designed to give you optimal recovery options. The advanced diagnostic routines dig deep into the Mac operating system tool box to search for and recover lost data in minutes. With the Norton Utilities you can even unformat an accidentally formatted hard disk. You also get Speed Disk, a powerful disk defragmenter and optimizer to significantly increase system performance by reducing data access time. #04078

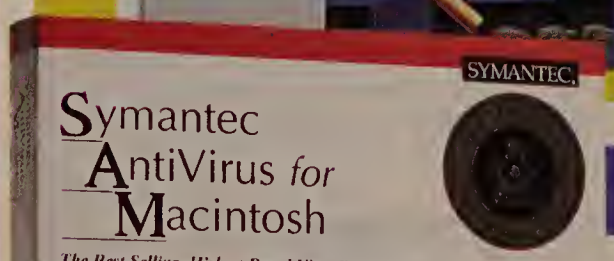


NEW VERSION!

Symantec Think C

$199

Think C integrates the editor, linker, and compiler to form a complete C language development environment. Many major Mac applications have been developed in Think C, including Quark XPress. Version 4.0 now supports Object Oriented Programming (OOP) with a number of compiler enhancements and a full class library. It provides full source level debugging and the compiler produces tight, highly-optimized codes. #04095

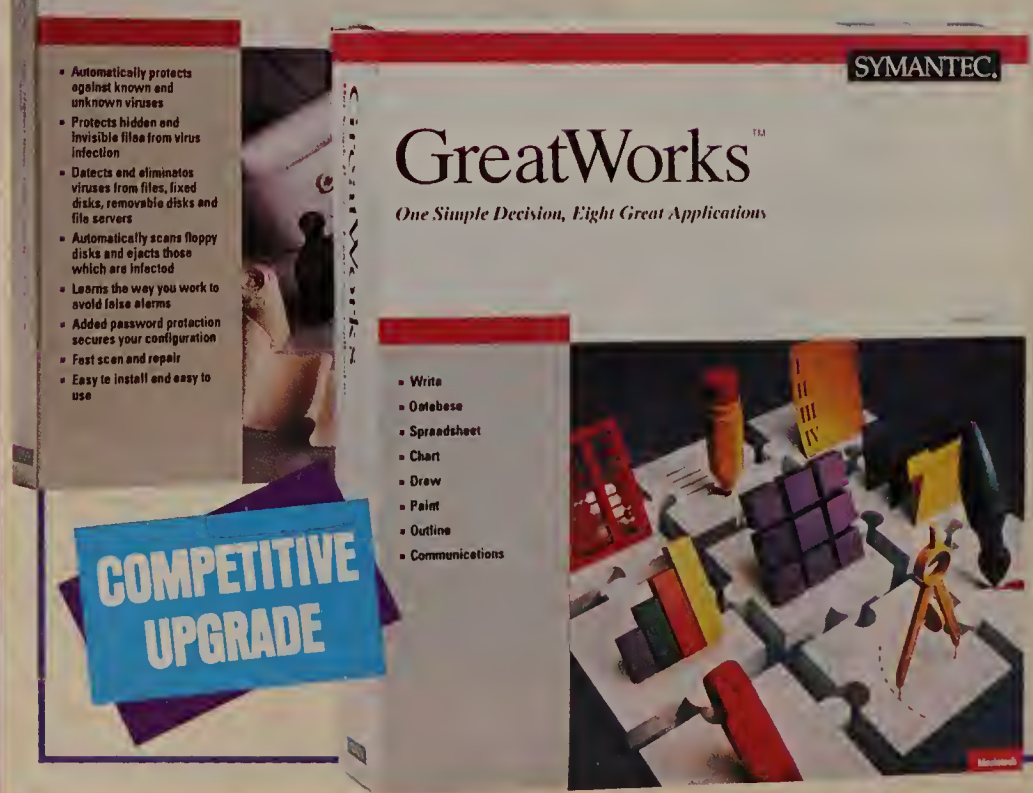


GREAT PROGRAMS AT GREAT PRICES

S.A.M. 3.0

$66

The Symantec Anti-Virus for Macintosh detects viruses by monitoring the suspicious activities that characterize them. The INIT portion acts like a watchdog during startup to detect viral activity. The CEIV portion operates during normal Mac usage and offers a number of options for checking disks and folders as you work. SAM has an Audit Trail to keep track of its activity and your responses. #00116



GreatWorks Competitive Upgrade

$98

Any owner of MS Works or AppleWorks can now step up to New GreatWorks' eight feature-rich applications in a single, easy-to-use integrated program. Get full word processing, database, spreadsheet, charting, drawing, painting, outlining and communications modules. Includes a 100,000 word spell checker and 660,000 word thesaurus. It runs in less than 1 MB of RAM, perfect for Macintosh classic on up. #04040

30-60 DAY MONEY-BACK GUARANTEE ON MOST PRODUCTS

Monster Group, Inc. MacSpeaker

$169 Mac-Speaker® opens the door to high-fidelity sound on your Macintosh. MacSpeaker is a compact, high powered speaker with a unique Sonic Imaging Control™ that gives a rich, full stereo sound in any set up. (Optional carrying bag available) MacSpeaker is compatible with any Macintosh. #00201

NEW!

Passport Master Tracks Pro 4.0

$318 Master Tracks Pro 4 turns your Macintosh into a 64 track MIDI recording studio. The improved cut and paste Track Editor is easier to use and has graphic MIDI volume faders for each track. A new Event Editor displays editable data for each track. Master Tracks Pro 4 can sync to SMPTE time code (with external hardware) and even control MIDI lighting boards. Enter music by playing it on a MIDI instrument or use the Step Time Editor. #02828

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Coda Finale

$548 Finale is designed to be the last music composing and publishing software you'll ever need. Finale understands music and music notation. Compose, edit, transcribe, orchestrate and publish without using a pencil. Improvise a score on a MIDI keyboard and see it displayed on screen in standard music notation in seconds. All you need is the inspiration to write music. Finale does the rest. #03127

Ars Nova Practica Musica 2.2

$68 One of MacUser's "Best 200 products of 1989" Practica Musica is a music tutor that covers ear training and music theory—for both beginners and advanced students. Using either the Mac speaker or a MIDI instrument, it teaches you how to recognize and notate intervals, chords, melody and rhythm, identifies chords that you play, gives you practice in writing tunes by ear and much more. It will even invent a short melody in your choice of key, scale and meter! Includes coordinated textbook Windows on Music. #01479

MUSIC, MUSIC AND MORE MUSIC!

PG Music Inc. Band-In-A-Box

$57 Automatic Musical accompaniment program. Just type in the chords to any song, using standard chord symbols like C or FM7 and choose from among 75 styles of Popular/Jazz music. The program then automatically generates a professional quality 3 part arrangement of bass drums and typical songs in 2 minutes. 1 meg memory required. An automatic jazz/rock combo inside your Mac! #03453

MIBAC Jazz Improvisation

$79 MiBAC Jazz improvisation lets you play with a jazz trio anytime you want. It creates authentic bass lines, piano accompaniment, and drum patterns in twelve different jazz styles. Choose a style, type in the chord progression, and start jammin'. Advanced features includes intros, codas, looping, mixing styles, bass pedals, and humanize rhythms. Export Standard MIDI files. #04284

Imaja Listen

$64 Listen features melodic and harmonic exercies, with matching and multiple choice drills. Exercises include: melody, growing melody, intervals, triads, 7th, 9th, 11th and 13th chords, atonal chords, tuning interval, chord, and inversion identification. Playback and answer on the Mac 4-voice synthesizer, Piano and Guitar windows, or a MIDI keyboard. Users can set the key, scale or mode, melody or interval range, chord arpeggiation, and pace. A notation window displays answers. #04281

MIBAC Music Lessons

$54 Have fun learning about music. Music Lessons' eleven drills cover Note Names, Circle of Fifths, Key Signatures, Major/Minor Scales, Modes, Jazz Scales, Scale Degrees, Intervals, Note/Rest Durations, Scales Ear Training, and Intervals Ear Tranining. Sounds can be played through your MIDI synthesizer, or from the Mac using Music Lessons' high-quality grand piano sound. On-line theory help, multiple skill levels, and detailed progress report make this package a must for musicians of all ages. #04283

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NEW! Mecc Software Super Munchers

$28

Learn fascinating facts in a variety of subjects— animals, famous Americans, food and health, geography, music, odds'n' ends, and sports— in this challenging, fast-paced game! The adventure centers around a contest, where, if you munch enough correct answers and avoid those devious Troggles, you could earn a place in the Hall of Heroes. More than 4,000 facts in 130+ categories. Options allow you to select game topics, criteria, and difficulty level. Levels of play become more challenging as you progress. #00500

Word Munchers

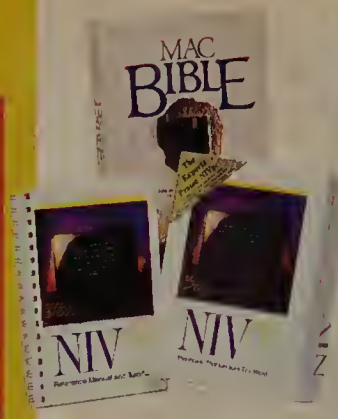
Learn vowel sounds the fun and easy way— with Word Munchers! As you race your Muncher around the gameboard, gobbling up words with the same vowel sounds, keep a sharp eye out for the troublesome Troggels. They love to eat Munchers! As you chomp words and accumulate points, try to earn a spot in the Muncher Hall of Fame! #00073

Number Munchers

Munch your way to math mastery! With the Munchers' help, you'll learn basic math skills the fun and exciting way. It mixes amusing graphics and sounds with practical math skills. Hundreds of different game boards ensure each game will always be new and exciting. As you attain more advanced math skills and want more challenge, you can change the difficulty levels of the game. #00072

YOUR CHOICE $28

ZonderVan MacBible New International Version



ZonderVan MacBible presents several different versions of the Bible to help you understand its meaning more clearly. It quickly finds the passage you want. . #00016

$78

#00021	Greek	$109
#00023	Hebrew	$109
#00017	King James	$78
#00018	RSV	$78

Davidson MathBlaster

New Math Blaster Plus is an arcade style game using new cosmic activities and graphics. It covers addition, subtraction, multiplication, division, fractions, decimals, percents and teaches over 750 math facts and problem solving skills. #00825

$34

CALL THE MACZONE TO LEARN A NEW LANGUAGE

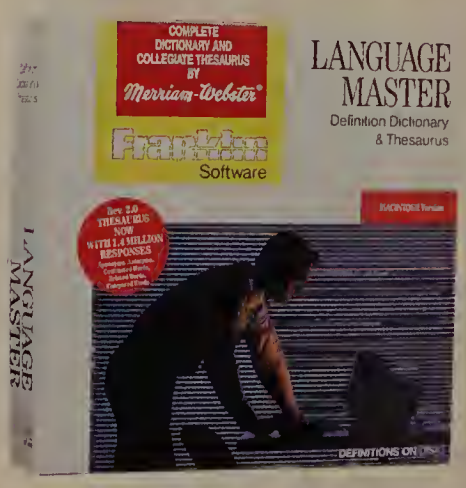
Hyperglot Survival Manual

$39

An electronic phrase book. Program is divided into topics of interest to travellers: Greetings, Hotels, Food, clothing, Communications, Transportation, Health, etc. Each topic contains about 25 recorded phrases. User clicks on phrase, hears native speaker pronounce it, and sees a translation. Extensive notes available about the topic being studied. Many other phrases besides the recorded ones available for each topic. A Phrase Finder allows user to find the phrase he/she wants to hear. STANDOUT FEATURES: If user has MacRecorder, he/she can record your own voice right into stack and then compare his/her pronunication of the phrase with that of the native speaker. Sounds thus recorded can be renamed and erased.

#04234 French #04235 Spanish #04236 German

Franklin Electronics Language Master



Language Master combines an electronic dictionary of definitions with an electronic thesaurus giving you access to words, definitions and synonyms which will help the efectiveness of your communications. I your query word is misspelled, Language Master will suggest a list of alternative words. With the help of the computer, a single unified reference work is possible and is available in Language Master. #00010

$44

LEARN ON CD'S

YOUR CHOICE $59

Hyperglot On CD's

Program is divided into topics of interest to travelers: Greetings, Hotels, Food, Clothing, Communications, Transportation, Health, etc. Each topic contains about 25 recorded phrases. User clicks on phrase, hears native speaker pronounce it, and sees a translation.

#03893 Spanish #03892 French

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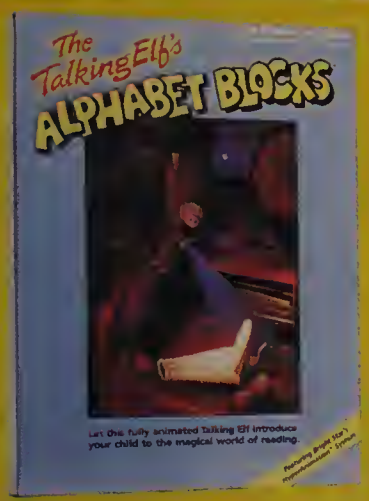
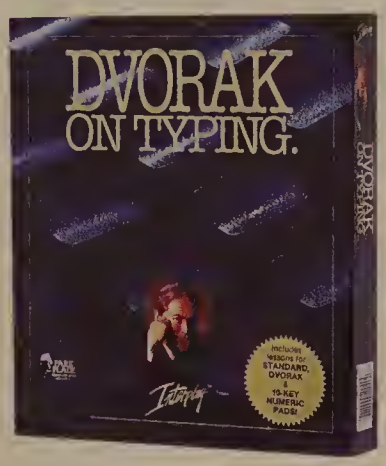


Brightstar Alphabet Blocks

$29 Alphabet Blocks teaches reading skills with an interactive talking elf. The entertaining animated character asks questions, and responds to answers. When the elf speaks, his mouth changes to show how the sound is made, thus teaching phonics and letter names. The elf adapts his questions to the learner's responses, guides him or her to the right answer, and tracks progress. Parent's manual included. #01614

Interplay Dvorak On Typing

$31 Dvorak on Typing™ is the first major typing program to feature a human voice that sounds out the letters as you type, helping you to become confident with touch typing. These user-friendly skill-building lessons take you step by step through the basics— hand placement, key location, shifting, etc. As you progress, the program's brilliant graphics take you easily through the formation of sentences, paragraphs and full correspondence. The program's voice works with you through menu selection, and later lessons even dictate to you verbally. #04256



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Established 1986

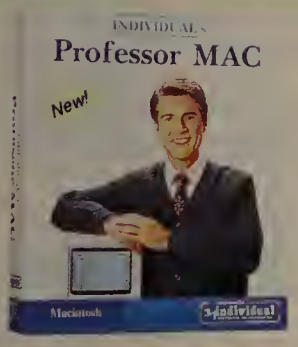
Mecc Software Oregon Trail

$28

Players load up their gear and hit the trail with other pioneers in this realistic, award-winning learning simulation. While they experience the life of the American frontier along the 2,000 mile route, players talk with colorful characters, navigate rushing rivers, and meet friendly Native Americans. And their families depend on them to make crucial decisions at every turn. #00074

MAKES LEARNING FUN!

LEARN TO USE YOUR FAVORITE PROGRAMS

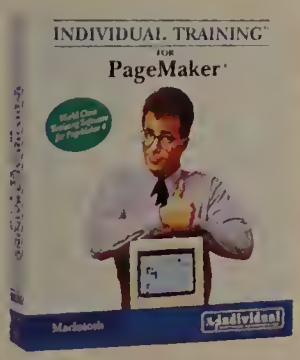


Individual Software Professor Mac

$29 Professor Mac is your personal tutor on proper use of your computer. He'll take you through all the basics with an introductory tutorial that starts where Apple's guided tour left off. The self-paced lessons use an interactive Q&A format to guide you through. Quizzes help you evaluate your progress. #03988

Training for Microsoft Word

$29 It takes you through a series of step-by-step on-screen lessons which teach you to take full advantage of Microsoft Word. Under MultiFinder™ you can run this program side-by-side with Word. Offers extensive coverage of basic skills, formatting and styling, editorial features and how to be a power user. #00436



Individual Training for PageMaker 4.0

$29 Takes you through a series of step-by-step on-screen lessons which teach you to take full advantage of Microsoft Word. Users will learn document and file concepts, use of fonts, sizes and formats, page set-up and printing, utilizing section options, and creating style sheets. Includes spell checking and hyphenation, creating an index, table of contents, using tables and footnotes, using print merge, creating custom menus, preferences and learning tricks of the trade. #03758

WITH UNIQUE CUSTOMIZING FEATURE!

Reading Maze

$24

ReadingMaze, an innovative reading program specially designed for children ages three to seven, teaches hundreds of early words including nouns, adjectives, prepositions and verbs, while supporting critical learning skills, such as strategy, space relations and manual dexterity. Students move through the rooms of a fascinating house, while solving picture, word and sentence problems. A unique customizing feature allows parents or teachers to tailor the program to the individual students' needs. Exciting graphics maintain students' interest. #04249

#04248 **Color** **$34**

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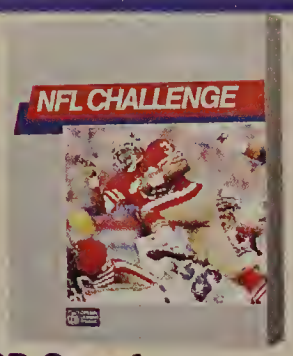
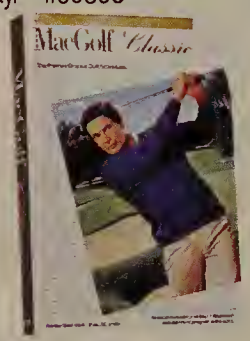
XOR



XOR Sport NFL Challenge

$53 NFL Challenge is the most authentic, realistic football game ever created for computers. Features: all 28 NFL teams, computer coaching, two levels of difficulty, animated play action with slow-motion instant replay. #00895



XOR MacGolf Classic

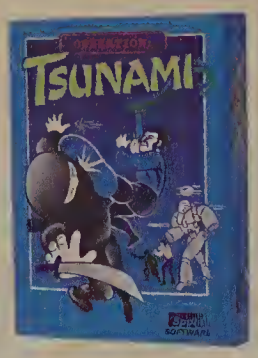
$49 MacGolf Classic offers vivid full-screen color graphics with unmatched screen image detail. Five enlargement options for close-up viewing. Nine practice greens and a driving range. Control your stance, ball placement, shot direction, swing, choice of 14 clubs. #01984

XOR MacSki

$37 MacSki brings the slopes to you. Select a course from a number of challenging runs or design your own using the Course Editor. MacSki is your lift ticket to FUN. #03625

Spph Software Operation Tsunami

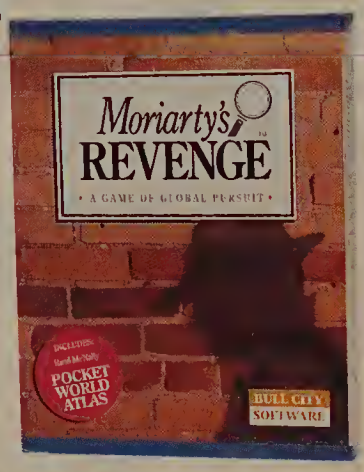
$24



In Operation Tsunami your mission is to neutralize a fiendish king pin and his plans to take over the entire Asian continent. To stop him, you must fight through his skilled troops, mutant insects and evil robots. If you get far enough, you must then face the greatest challenge... the MasterMind himself. #04229

Mysterium Tremendum Moriarty's Revenge

$31 The infamous Dr. Moriarty is now leader of a world-wide crime organization and you must track him down. You'll travel the world, taking notes, puzzling over clues and trying to stay alive. Over 1,0000 clues and a computerized notebook to keep them in. With varying levels of difficulty, it's never the same game twice. #03290



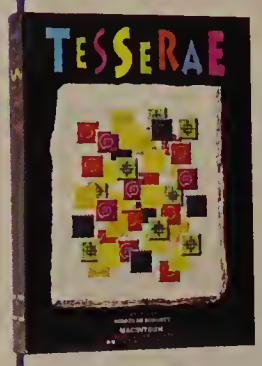
Delta Tao Strategic Conquest 3.0

$37 Strategic Conquest 3.0 is one of the best military strategy games for any personal computer. You control the production and movement of your armed forces in a struggle against an enemy bent on world domination. The fate of the world depends on your strategic and tactical decisions. #04083

INLINE DESIGN

Tesserae

$31 Tessarae is a color puzzle game in which the player eliminates tiles from a "board" according to color and texture. When only one tile remains on the board, a different, more difficult arrangement appears. For the beginner the object of the game is to remove as many tiles as possible. The more advanced player tries to improve his high score by using the fewest possible moves. #03934



Darwin's Dilemma

$31 Loosely based on the ideas of evolution, Darwin's Dilemma is a captivating strategy game in living color. The player moves up through the levels of the game by colliding and merging icons that represent increasingly complex life forms. Each level brings new creatures and a more difficult puzzle to solve. #03494

3 In Three

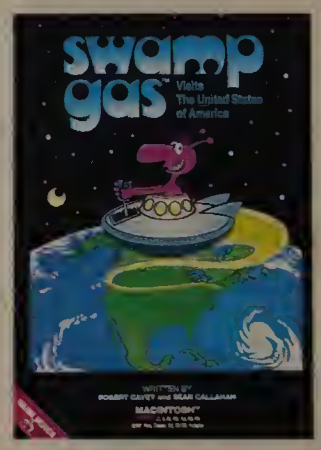
$32 3 in Three is an animated color puzzle game. A number 3 has become lost inside the CPU of a computer, and she wants to find her way back to her spreadsheet. To help her on her way, the player must solve a score of original brain-teasing puzzles. #03599

Mutant Beach

$44 Mutant Beach is a fully-animated, full-color interactive action adventure game, starring Native Nick, a laid-back islander. Nick must overcome amusingly mutated creatures, along with traps, false paths, and locked gates, to return the stolen nose to his island's idol. Never before has such detailed flicker-free 8-bit animation been available for an interactive Macintosh game. Users of Apple's System 7.0 will also enjoy four-channel multi-track sound. #04252

Swamp Gas

$32 Swamp Gas is an animated color game that teaches United States geography. An extraterrestial lands in America and must visit a number of states, cities, and landmarks. After he completes his mission, the alien returns to his mother ship, where the player may visit the Alien Arcade and play one of three uniquely humorous and quirky arcade-style games. #04251



Spectrum HoloByte Vette!

$32 Vette! puts you behind the wheel of America's premier production sports car in the streets of one of the most alluring cities in the world - San Francisco! Pit your racing skills against top European sports cars as you fly up and down those steep San Francisco hills. There are designated start and finish points. Vette! comes equipped with all those driving nuisances (like pedestrians, trucks, police, taxis - and those dreaded California traffic jams!) #03808

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Kid Pix

$31 KidPix is an amazing paint program created just for kids. It combines special effect art tools, picture stamps, sounds and magic screen, transformations to turn the computer into a magical art studio. With Kid Pix, you don't just paint a masterpiece, you hear it too! Every brush and tool has its unique sound effect. You can even record greetings, poems or music to enhance your creations. #03994

Where In Time Is Carmen Sandiego?

$28 Chase Carmen and her gang through 1500 years of world history picking up clues on historical events, scientific inventions and famous people. #03513

Sim Earth

$39 Take charge of an entire planet from its birth until its death - 10 billion years later. Guide life from its inception as simple-celled microbes to a civilization that can reach for the stars. Promote life, move mountains, create and destroy continents, Terraform hostile worlds, influence evolution and cultivate intelligent life-forms. #03800

FTL Olds

$29 Rescue the OIDS from the fiendish Biocretes who are turning them into vending machines and household appliances! Create your own games with the OIDS Construction set. Design your own planetoids and puzzles in minutes with simple cut-and-paste operations. Make new games for yourself or trade with friends. #00240

Interprise Software Cyberblast

$24 More to shoot, dodge, and grab, than any Arcade Hit on the Mac! Excellent sound effects as you wind your way through 60 action packed levels - the clock is ticking and each level is more difficult to solve than the last. Discover ID cards, magnets, maps, zappers, bombs and grenades to help you destroy the enemies and walls that block your path. Dodge or destroy over 20 different size enemies—drones, seekers, bubblers, guardians, launches, and gyros that dance, bounce, spin and shoot. #04189

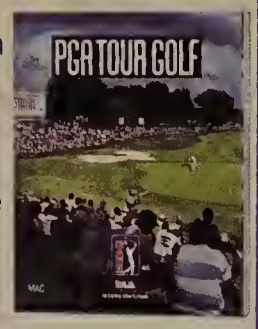
Bungie Software Operation Desert Storm

$27 Join the Forces in the Gulf with this realistic battle simulation! As commander of an M1A1 Abrams tank, you'll be sent on a series of missions against a hostile, well-equipped enemy. Use your 120mm Cannon and armor-piecing TOW missiles to destroy Iraqi assets, including weapons depots, SCUD launchers, nuclear facilities, chemical weapons factories and more! #04106

ELECTRONIC ARTS

PGA Tour Golf

$38 Tee off against 60 top PGA Tour pros in real tournaments on actual Tournament Player Club courses. Stunning color or B&W graphics with TV-style coverage. Fast animations and accurate ball play. #00473



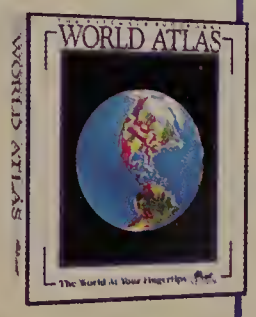
Harpoon

$39 As Commander of NATO's North Atlantic Naval Task Force, with a devastating arsenal of weaponry, you alone must face the Soviet battle fleet. Mastermind tactics and strategies. Stimulates and challenges like no mere game can do. #03600

#00304 Battle Set #2 . . . . . $22
#00306 Battle Set #3 . . . . . $22

World Atlas

$49 World atlas, almanac and world fact book, with instant access to over 240 fully detailed, EGA/VGA color maps and database of international information. #03589



Earl Weaver Baseball

$33 More stats than the Sunday Sports page. Camera angles rivaling network TV. Puts history's most winning manager in the dugout. Play and/or manage with real players stats. Four skill levels. #03602

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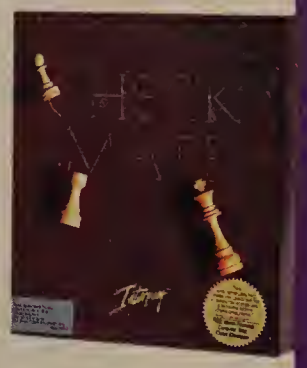
Interplay Checkmate

$34 CHECKMATE is the most powerful and versatile chess program on the market, with state-of-the-art graphics, a higly intuitive user interface, and the widest range of features found on any micro-computer chess program. #04135

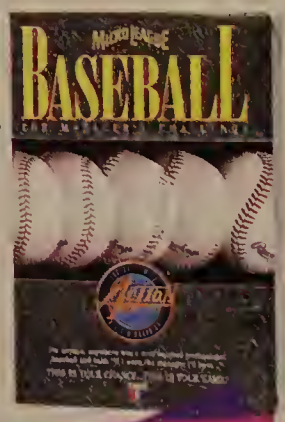


Interplay Battle Chess

$29 An entire medieval world at war is reflected on the checkered field. Everyone who's ever had a knight take a pawn has seen that capture as more than one piece replacing another on the board. In players' minds, the bold knight sallies forth and slays the foul footsoldier. #04134

MicroLeague Sports The Managers Challenge

$28 MLB is not a game for minor leaguers. It's not a "no-brainer" arcade style game, requiring only a quick wrist and good hand-eye coordination. MLB-MC is the thinking man's baseball. A game for fans, stat buffs, and all true lovers of America's national pastime. A game for you. #04259



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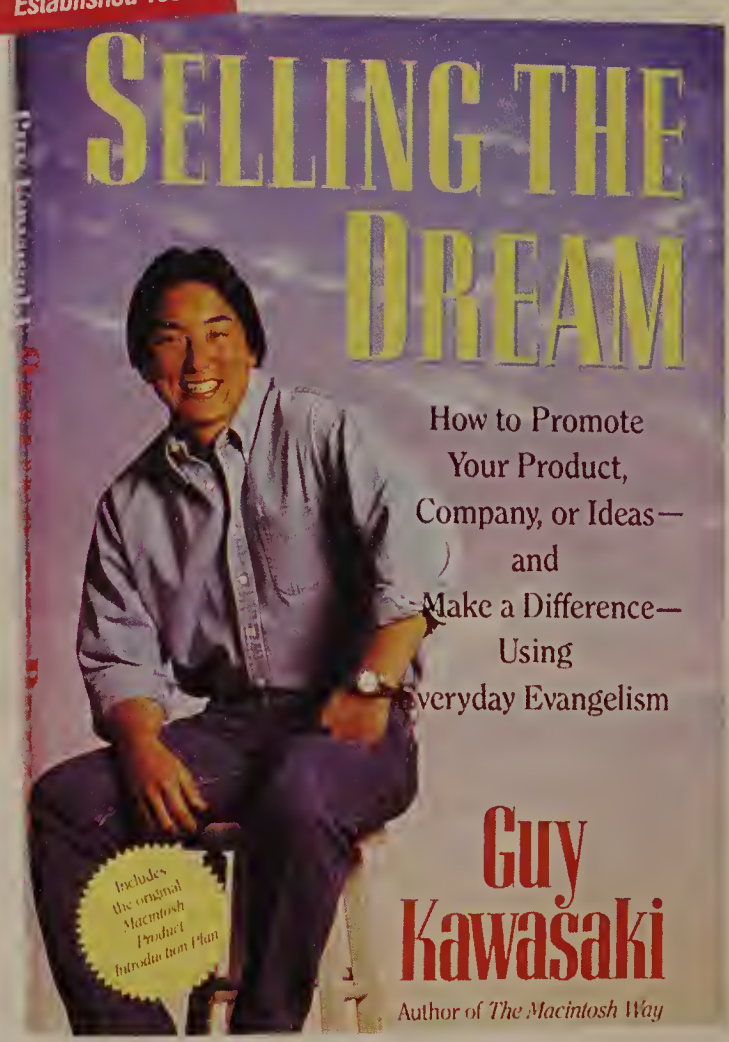


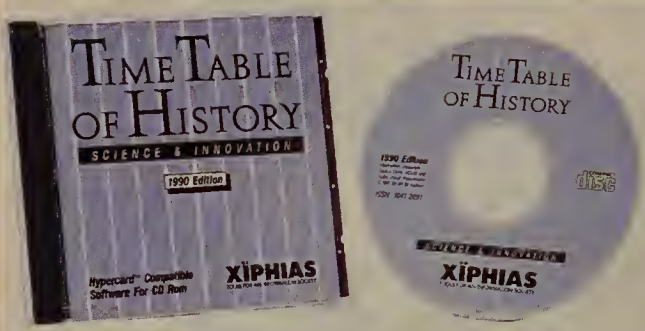
Guy Kawasaki's *Selling the Dream*

$19.95

A new approach to selling— how to turn your customers into converts — from Apple Computer's software evangelist and the author of *The Macintosh Way*. Guy Kawasaki was phenomenally successful at Apple Computer and as a start-up entrepreneur because he utilized a new approach to selling a product called evangelism. Evangelism means converting people to your product, company, or idea. These individuals then adopt your cause and become as zealous as you are. Kawasaki provides a blueprint for implementing evangelism, including creating and finding a cause; developing evangelism business plans; making infectious presentations; and sustaining a cause over the long haul.

"I wish we had the benefit of this book when we started Apple and NeXT. Guy clearly expresses what it took us years of mistakes to learn. I would have paid many times the cover price to read it ten years ago." —Steve Jobs, president, NeXT Computer, Inc.

Guy Kawasaki, author of *The Macintosh Way* (more than 60,000 copies sold), currently writes a column for *MacUser* magazine. 320 Pages. #04068



Xiphias TimeTable of History

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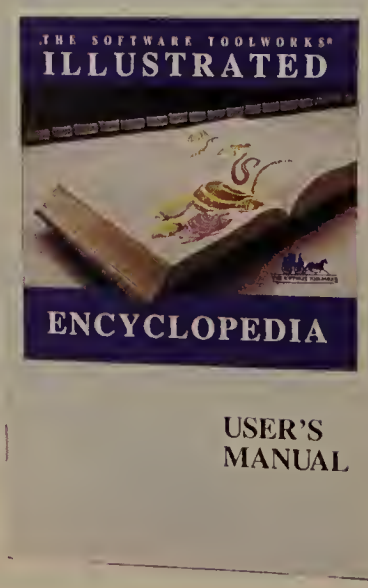
Time Table of History, Science & Innovation: Over 6,000 stories representing the chronology of scientific and technical events from the "Big Bang" theory to the present. Every word is linked to all other stories with the same word for easy navigation. Over 1,000 graphics and sounds enhance the Time Table experience. #00516

The Software Toolworks Illustrated Encyclopedia CD

$239

From the first moment you use it, the Software Toolworks Illustrated Encyclopedia will show you why it sets the standard for research tools, boasting more than 33,000 articles including 3,000 new or updated items. Plus, you can now access 1,500 quality, full-color illustrations and vibrant photos from within articles themselves of from a convenient picture index. #00515



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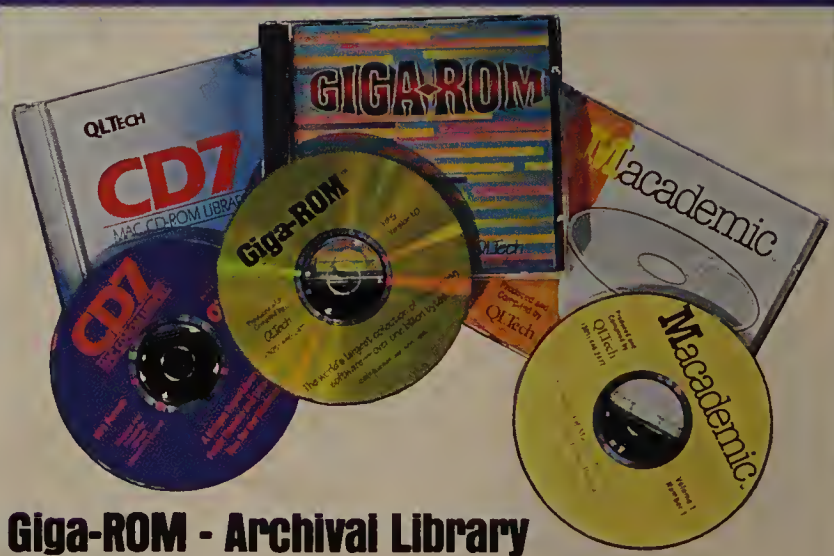

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The largest collection of Mac software ever assembled on single compact disc, over 11,000 shareware archives in compact format. Indexed with On Location for super-fast search and retrieval. #00152

Macademic - Education Library

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CD7 - Super Library

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Modern Twenty
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PL Westervelt
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Wayzata EPS Professional

$189

EPS Professional is the disc you have been waiting for! It is ideal for desktop publishing; it has over 700 high-quality, fully resizeable Encapsulated Postscript images. The disc also has more than 100 decorative borders, including the one used here. All Wayzata photography and clip art CD-ROMs have unlimited reproduction rights. Use these images in international publications or even television and multimedia. #04043

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BBS In A Box

$78

BBS in a Box is the first CD ever produced for the Macintosh BBS that provides over 7,000 Macintosh files in compressed format with BBS directories for BBS or personal use. These directories are provided on eighteen topics including Art, Business, DA's, Games, Films, Newsletter Articles, HyperCard, Music, MIDI, Mac II, Voices, Telecommuncations, Utilities, Word Processing and more! #00241

The Washington Times

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The Washington Times and Insight on the News CD-ROM brings you the power of Front Page News™ with an editorial twist. Wayzata has captured both the Washington Times and Insight on the News on a single full text CD-ROM. With the Washington Times you obtain national news plus the inside track on political happenings. You not only receive the headline articles, but also Commentary, Money, Sports, Weather, and more! This disc covers June 1989 to June 1991. #04044

All of Mac Tutor

$155

MacTutor publishes software development programming aids in its monthly magazine. This disc contains all the information from each of the magazines from December 1984 to December 1990. The Articles, Editorials, Source Code, Reviews, Letter and Mouse Hole Bulletin Board Report are included. The disc includes the contents of "The Best of MacTutor Source Code CD-ROM" disc. An upgrade is available directly from Wayzata Technology. The disc also contains a HyperCrd stack which is a subject, author and title index of the MacTutor magazine articles. #03506

Disc To The Future

Disc To The Future - Programmer's Reference is a collection of over 250 megabytes of source code and utilities for the Macintosh programmer. It includes 4.2 megabytes of System 7 examples. It includes a full-text database of the source code contained on the disc. The disc is accessed using TextWare™, a high speed database search and retrieval engine. #03507

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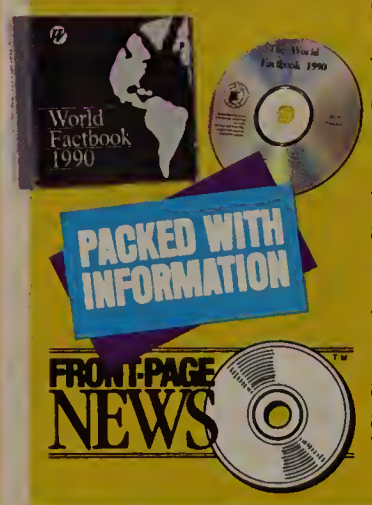

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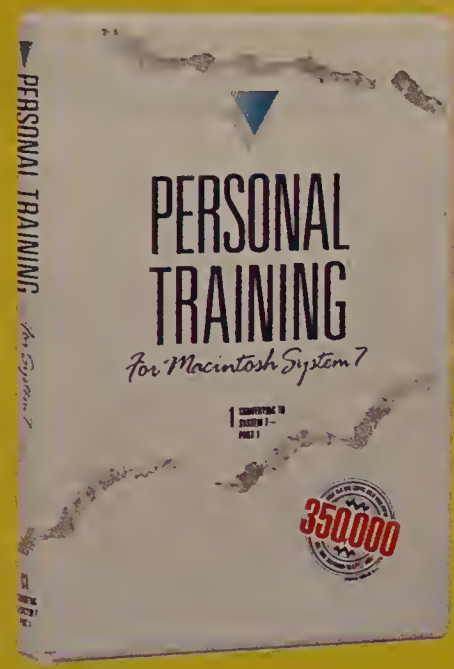

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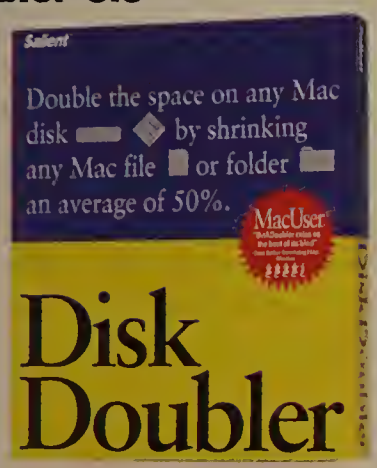

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Circle 9 on reader service card

MACWORLD NEWS

by Dan Littman and Tom Moran

Apple/IBM: Is the Color Purple?

Okay, okay, we were all a little shocked, but now we're all wondering what's going to come from the Apple-IBM alliance. At this writing in August, the final agreement had not been signed as the two companies were hammering out final details, but the initial "areas of general understanding" included the following:

- Apple and IBM will form a joint venture that will develop an object-oriented operating system capable of working on multiple hardware systems. That means that a single version of an application could work on computers made either by IBM or Apple or by other vendors, since the two companies will offer the operating system to other computer manufacturers. The computers could potentially include everything from laptops to mainframes. The future operating system would theoretically run on systems based on processors including Intel's 80X86 family, Motorola's 68000 family, and the relatively recent RS/6000 processor chip set designed by IBM. Current plans call for the company to draw personnel from Apple's Pink (future operating system) project, and from Patriot Partners, an existing joint venture between IBM and Metaphor Computer Systems, a pioneer in object-oriented programming. The venture is already being called Purple because of the combination of Apple's Pink with Big Blue.
- Apple will use IBM's RS/6000 RISC chip set in future Macs. This should be the next-generation Macintosh, not a completely new architecture like the one expected from the joint venture. Motorola, Apple's longtime processor supplier, had bid, apparently unsuccessfully, for Apple's future RISC business but was given the job of integrating the chip set into one chip and will be licensed to manufacture it. The chip will be called the Power PC.
- Apple will integrate the Mac more closely into IBM's enterprise-wide architectures. The companies say they will codevelop and market networking and other communications solutions. They will also do a new version of AIX (IBM's flavor of Unix) that will have a choice of the Macintosh interface or the OSF/Motif interface.
- Apple and IBM will work together on architecture-independent multimedia products and license them to other vendors.

ERIC ADIGARD/MAD

Igor, more power, more power! The ghost of 1984 hovers in the laboratory, as weird and unnatural forces bring Apple and IBM closer and closer to . . . ???

Any real products from all these ventures are probably at least two years away. But since the Apple-IBM agreement represents an important validation by IBM of Apple's operating-system technology, the short-term result may be an increase in Apple's sales. After all, IBM has essentially abandoned DOS and Windows development, and OS/2 is looking a little embarrassed at best. And IBM had its choice of a lot of other operating systems that it licensed and/or acquired in the last few years. One would think Microsoft could have seen the writing on the screen as each of these rights was acquired, but it's not in Microsoft chairman Bill Gates's nature to give up a competitive advantage to merely stay in the game. Intentionally

(continues)

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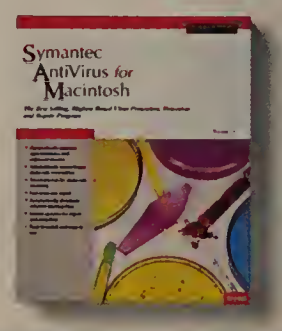

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or not, Microsoft bamboozled IBM by publicly saying "Yes, we're committed to developing for IBM's version of OS/2," while privately remaining more committed to Microsoft Windows, and when IBM had lost often enough, it took its great big ball of clout and went home. Now there's a new game in town, and we'll probably all find ourselves playing in it.—**T.M.**

STEVE BLOCH

The Phaser II PXi thermal-wax transfer printer includes a PostScript Level 2 controller and color matching.

Color Printer Adds PostScript Level 2

Tektronix has begun shipping the Phaser II PXi, which the company calls the first color thermal-wax transfer printer to incorporate Adobe's PostScript Level 2. The printer's controller incorporates a new version of the TekColor color-matching system that has been optimized for PostScript, and supports Pantone spot-color matching. The controller also includes an AMD 29000 RISC processor for faster processing of the print image.

The 300-dpi printer, which can produce about 8 million colors, puts out a full-color page in about a minute. It comes with a serial port, parallel port, AppleTalk connector, and SCSI interface. The printer automatically switches among the serial port, parallel port, and AppleTalk connector as it senses incoming files. The Phaser II PXi's 6MB of memory can be expanded to 10MB.

Tektronix also announced that it changed the name of its PhaserJet PXi after a dispute with Hewlett-Packard over similarity to the name of HP's LaserJet line of printers. The former PhaserJet PXI, a phase-change ink-jet color printer that uses plain paper, is now called the Phaser III PXi.

The list price of the Phaser II PXi is $7995. For more information, contact Tektronix in Wilsonville, Oregon, at 800/835-6100.—**T.M.**

Sculpt 4D: Animation for Modelers

When Byte by Byte decided to port its popular 3-D modeling and rendering package from the Amiga to the Macintosh, the company entered an already crowded market. But Sculpt 3D on the Mac has been carving out a niche for itself as one of the most powerful programs available—and one of the priciest, at $2500 for Sculpt 3D and $3500 for the new Sculpt 4D, which adds animation to the mix.

Sculpt 3D's geometry can be edited vertex by vertex, as opposed to the polygon-based system common to most Mac 3-D programs. With a vertex system, users can change the shape and even the color or texture of each facet of an object.

The 4D version's animation tools support nested spline motion paths, a technique that lets you lock the paths that objects move along onto other objects, which may also be moving along a spline. Paths can be nested up to 24 layers deep. Sculpt 4D can *tween,* or fill in, information between key frames, for motion, lights, the camera that "records" the animation, colors and textures, and even shapes that metamorphose into other shapes. Sculpt's rendering capabilities include ray tracing, bump mapping, Phong shading, and texture mapping.

REED McCOUGH

A frame from a Sculpt 4D animation. The black-and-white picture rolls under the ink spigot and gets colorized.

Sculpt's interface is somewhat complex and has been criticized as not sufficiently Mac-like, though Byte by Byte president Scott Peterson argues that 3-D is CAD, not drawing, and the interface requires some complexity to give the user CAD-level precision. Also, Sculpt lacks some of the preview features available with other Mac packages.

Byte by Byte plans to develop add-ons for Sculpt to simulate gravity and give objects physical properties like flexibility and compressibility, which will enable animated objects to interact in realistic ways such as deforming on impact.

Byte by Byte is in Austin, Texas, at 512/795-0150.—**Rusel DeMaria**

The Virtual Roundtable

The giant European software distributor MacVonk is bringing to these rude shores a group-discussion package called Inforum that competes with On Technology's Instant Update. Both packages allow users to share a text document across a network, making changes and adding comments that others can examine and reply to later.

MacVonk's Inforum and Instant Update differ in several ways, the most obvious being their interface. Instant Update users add paragraphs to a document that looks like a standard word processor document; each person can use a distinct text style, and gray or black bars in the margin keep you informed of changes others have made that you haven't seen, or changes you've made and not passed on for others to see. Inforum documents have a sort of tree chart or outline structure, with three side-by-side windows for discussion topics, statements about each topic, and responses to statements.

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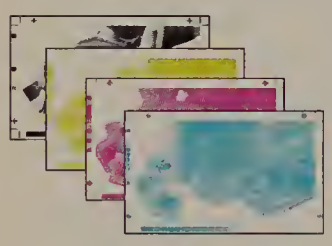
Images scanned on a ScanMaker 1850S 35mm Slide Scanner

Microtek removes the biggest barrier to owning a Slide Scanner



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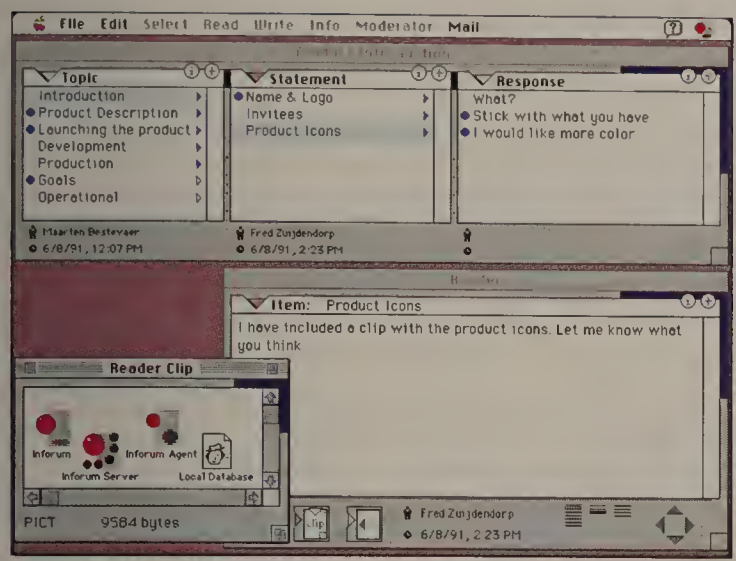

Inforum's three-column hierarchy moves from topics, to statements about topics, to comments on each statement.

The net result is that Inforum discussions are likely to be more brainstorming-oriented and more tightly structured than Instant Update discussions, especially since the person who initiates an Inforum file controls who can read and write to it and who can move or delete pieces of it. Instant Update, on the other hand, is more geared toward developing a completed document. It provides tools for creating tables in a file and can search a file by contents and by authors. Inforum supports attaching sounds and graphics files, provides date-stamping and time-stamping, and can sort the three lists.

At about $50 per user, Inforum is a bargain compared to Instant Update, which is about $200 per user. Inforum requires System 7. MacVonk is in Narbeth, Pennsylvania, at 215/660-0606. On Technology is in Cambridge, Massachusetts, at 617/876-0900.—**D.L.**

PrecisionColor 8 Shows Multiple Resolutions

Radius Corporation has introduced the PrecisionColor 8, a midrange graphics adapter that offers multiple resolutions and can work with more monitors than could previous Radius graphics boards. The 256-color board works with Mac II–family systems at resolutions from 640 by 480 pixels to up to 1152 by 882 pixels.

The PrecisionColor 8 works with color or gray-scale monitors from Radius and other third-party vendors, and with Apple's color monitors. It can also drive VGA and SVGA monitors designed to work with IBM PCs and compatible systems, according to Radius. The board supports monitors up to 21 inches in diameter.

Currently shipping, the PrecisionColor 8 display adapter lists for $795. That price includes a NuBus adapter for use with the Macintosh IIsi. For more information, call Radius in San Jose, California, at 408/434-1010.—**T.M.**

Expresso Pours Hot Color

RasterOps has introduced the Expresso, a low-cost personal slide scanner intended to be used with a TV as a video slide projector or photo-archiving system, or for adding color graphics to presentations or publications. Like many more-expensive slide scanners, the Expresso uses a CCD sensor. However, RasterOps noted that the $999 device was not designed for graphics applications that require the highest-quality input.

LUIS DELGADO

The Expresso color slide scanner can work with a TV as a video slide projector or as part of a photo-archiving system.

The Expresso can accept 35mm slides or negatives. It produces NTSC-format output that can be displayed on a TV, recorded on a VCR, or sent to any frame grabber for digitizing. RasterOps said it is also offering a version compatible with the European TV format called PAL.

All or part of the slide or negative can be selected for scanning at a basic resolution of 476 dpi or at up to 1428 dpi in zoom mode. The Expresso can detect up to 16.8 million colors.

RasterOps began shipping the Expresso slide scanner in August. For more information, contact RasterOps in Santa Clara, California, at 408/562-4200.—**T.M.**

Outbound Ships Notebook Macs

Outbound Systems has introduced Macintosh-compatible notebook-size computers that it calls the Outbound Notebook System family. The three basic computers are the Notebook System 2000, which is based on a 20MHz 68000 processor; the Notebook System 2030, which has a 20MHz 68030; and the Notebook System 2030S, which adds a 6882 math coprocessor to the Notebook System 2030. The notebooks, which ship with Apple ROMs, all weigh 5.7 pounds with a floppy disk drive but no hard drive. With an internal hard drive they weigh 6.25 pounds. All the configurations include the 1.44MB SuperDrive-compatible disk drive, a backlit LCD display, and a keyboard with the same layout as the SE keyboard but without the numeric keypad.

The Notebook System 2000 comes

(continues)

This just might be as portable as a 40MB drive ever gets.

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as Quantum-backed La Cie..."

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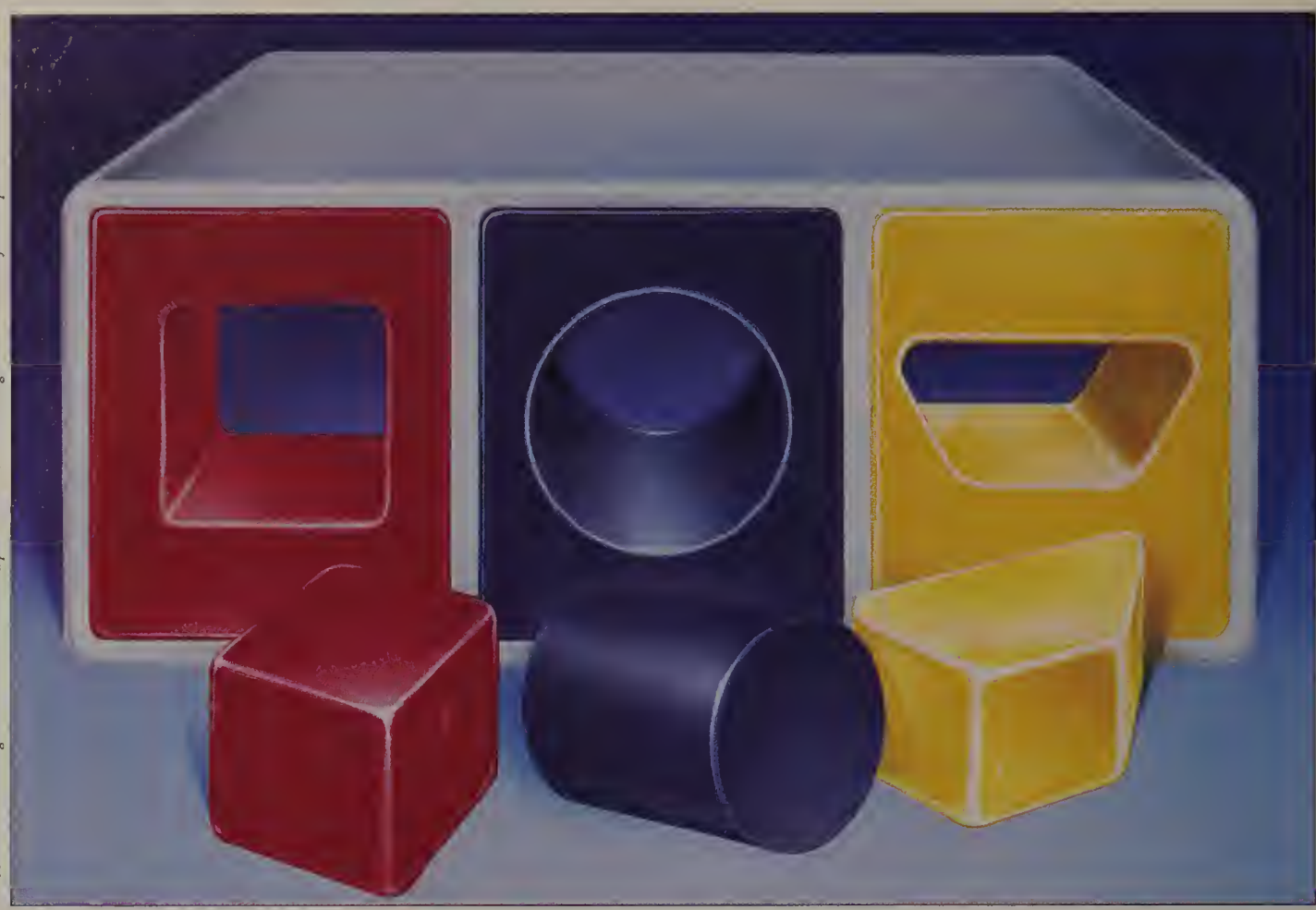

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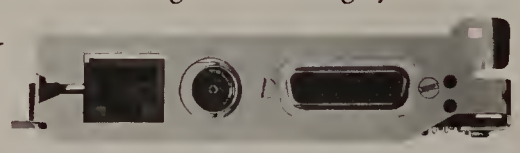
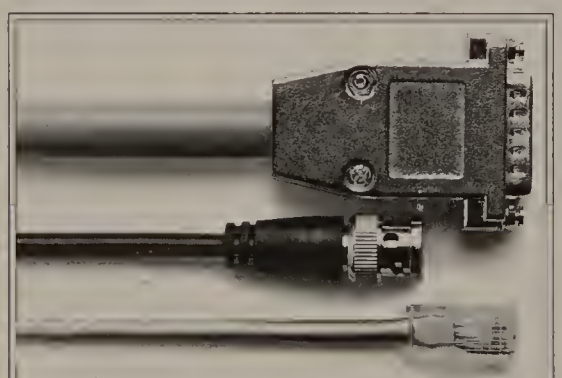


[Asanté products have on-board ports for all three Ethernet media. It's a system for today that you'll never outgrow.]



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The Outbound Notebook System weighs only 6.5 pounds including an internal hard drive with a capacity of up to 60MB.

with 2MB of RAM expandable to 4MB, and a choice of a 20MB hard drive or 40MB hard drive. The Notebook System 2030 also has 2MB of RAM expandable to 4MB, but it offers a choice of a 40MB or 60MB hard drive. The Notebook System 2030S ships with 4MB of RAM (the maximum) and can include either a 40MB or 60MB hard drive. A 120MB hard drive for all the Notebook Systems should be available sometime in early 1992, according to Outbound.

For international use, the computers incorporate a universal switching power supply that can operate from 100 volts to 240 volts at 50Hz or 60Hz. The Notebook Systems use a standard rechargeable camcorder battery that supports approximately three hours of operation and can be easily exchanged for a fresh battery.

All the Notebook Systems have a built-in TrackBar pointing device located in the center of the keyboard below the spacebar, but they also have an ADB port for an optional Apple ADB mouse or other ADB device. The systems include printer, communications, and SCSI ports; an AppleTalk connector; and a built-in microphone and speaker.

The Notebook System 2000 and Notebook System 2030 are shipping now, and the Notebook System 2030S should be available in the fourth quarter, according to Outbound. Retail pricing for the currently available configurations ranges from $2529 for a Notebook System 2000 with no hard drive to $4299 for a Notebook System 2030 with a 60MB hard drive. For more information, contact Outbound in Boulder, Colorado, at 303/786-9200, or 800/444-4607.—**T.M.**

The Open Network

Nuvotech's products have leaned toward inexpensive duplicates of standard LocalTalk and Ethernet items, but the company is currently developing an innovative new line of networking hardware, as well as the software needed to take advantage of it.

The first product in its new line is the NuvoStar, an open-architecture network hub. The 24-port unit has slots that can be filled with other devices, such as a spread-spectrum radio half-bridge, which Nuvotech is also developing. Nuvotech says its radio half-bridge runs at 130kbps—that's about half LocalTalk's maximum throughput, and almost seven times the speed of a normal 19.2kbps modem bridge. Nuvotech is also developing an add-in board with 24 ports, to double the NuvoStar's capacity to 48 ports. The company plans to publish a specification for the NuvoStar's slots for others to develop other add-in boards, such as an Ethernet bridge.

The NuvoStar includes basic installation and management software. From any Mac the network administrator can search all the zones, select a device, and then choose from a palette of nine icons, each of which opens a window for performing activities such as monitoring traffic and network load, studying an error log, and scheduling unattended events like taking a snapshot of activity.

An upcoming version of the network-management software will include support for Simple Network Management Protocol, an industry standard that Apple has recently decided to support. Later, the software will draw a map of a network and provide tools for simulating the efficiency of different configurations as a network administrator moves and rewires icons of routers, bridges, servers, and other network devices.

The NuvoStar lists for $1495. Pricing for the radio half-bridge and future versions of the management software were not set at press time. Nuvotech is in Sausalito, California, at 415/331-7815.—**D.L.**

HP Unveils 24-Bit Color Scanner

Hewlett-Packard has introduced its first color scanner, called the HP ScanJet IIc. The 24-bit flatbed scanner works in one pass, for higher speed, at a resolution of 400 dpi. The scanning head uses a CCD sensor. The ScanJet IIc also doubles as an 8-bit gray-scale scanner.

The ScanJet IIc comes with HP's OCR software, called AccuPage, and also has printer-calibration capability. In the printer-calibration mode, the user scans a standard color image, then prints it and scans the printed image. Calibration software adjusts the file that goes to the printer so that

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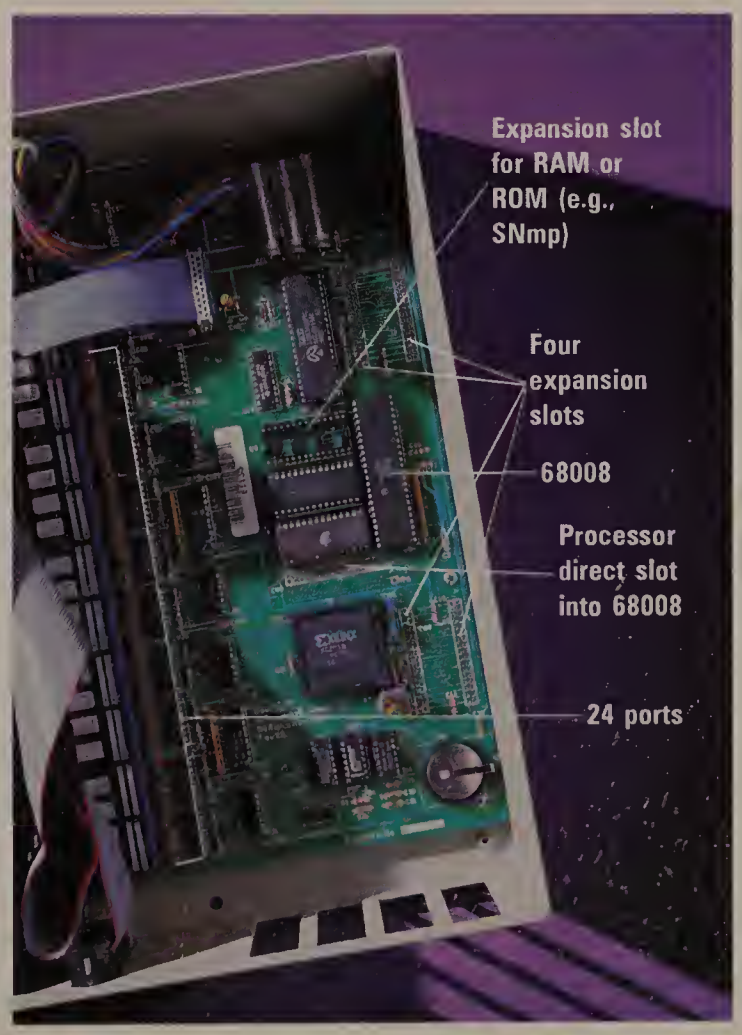

MARK JOHANN

The NuvoStar network hub with its many expansion slots.

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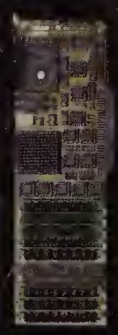

The Radius Rocket

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JEANNE STACK

The Hewlett-Packard ScanJet IIc, a one-pass 24-bit color scanner, comes with HP's AccuPage OCR software.

its output will be a better match with the standard image. Its preview mode displays a rough, 75-dpi version in about 5 seconds; the full-color, 300-dpi scan takes about 20 seconds.

HP expected to begin shipping the ScanJet IIc in early September at a suggested list price of $1995 for the Mac. An optional 50-sheet automatic sheet feeder should be available this fall at a list price of $695. Standard software with the Mac version includes HP DeskScan II and Zedcor's DeskPaint. For more information, contact HP at 800/752-0900.—**T.M.**

Remote-Control Macs

System 7's Publish and Subscribe is for trading information, but not commands, between applications. Passing commands back and forth would require some kind of macro generator or scripting language that works in all applications. Ignoring rumors that Apple is creating just such a beast, the developer community has raced ahead of the mother ship with scripting languages and utilities.

To forestall the total chaos that half a dozen incompatible scripting languages would create, Apple has announced Open Scripting Architecture (OSA). OSA takes a two-pronged approach to systematizing how scripting utilities and applications work together. First, it provides a mechanism for an application to broadcast information about what AppleEvents (commands from other applications) it can respond to, and to find out what AppleEvents other applications support. Second, OSA provides two types of standard AppleEvents: commands, or verbs, such as close, save, or get data; and objects, or nouns, that verbs act on, such as paragraph, row, column, or rectangle.

OSA-based products shipping or in the works include CE Software's QuicKeys 2.1 and CE/IAC, Simple Software's ControlTower, and UserLand's Frontier. While Frontier is command line–based (see *MacBulletin, Macworld,* August 1991), ControlTower has a

ROBERT HOLMGREN

Michael Odawa of Simple Software. Odawa's ControlTower puts a simple interface on making applications talk to each other.

much simpler interface in which users choose the application they want to control, and then the AppleEvent they want to send, by browsing through a series of lists. The series of AppleEvents can be saved as a script; ControlTower will include a debugger, and it incorporates Simple Software's NightLife to run scripts unattended.

QuicKeys 2.1 not only sends AppleEvents but also, using the CE/IAC INIT, receives them, making it possible to control QuicKeys externally. Since QuicKeys can work with older applications that don't support OSA, it can serve as a mechanism to send Frontier commands to non-OSA applications.

QuicKeys 2.1 lists for $149.95; prices for the other products were not set at press time. CE Software is located in West Des Moines, Iowa, at 515/224-1995; Simple Software is in Mill Valley, California, at 415/381-2650; UserLand is in Palo Alto, California, at 415/325-5700.—**D.L.**

The New Software Category

Fair Witness doesn't fit the standard definition of an integrated package. It isn't exactly an outliner. And it's not quite a personal information manager. That's why Chena Software coined a new term to categorize Fair Witness: work processor.

Fair Witness presents information in several views, which are convenient for different purposes. In the outliner view you can rough out and organize a project or, for a less structured approach, use the whiteboard interface called the Freeform view, which you can later convert to a flowchart.

The centerpiece of Fair Witness is a vaguely spreadsheet- or database-like table called the Information Chart, in which each item from the outline becomes a row and you can add as many columns as you like. Column types include plain text, dates, numbers, pictures, icons (there is a built-in icon

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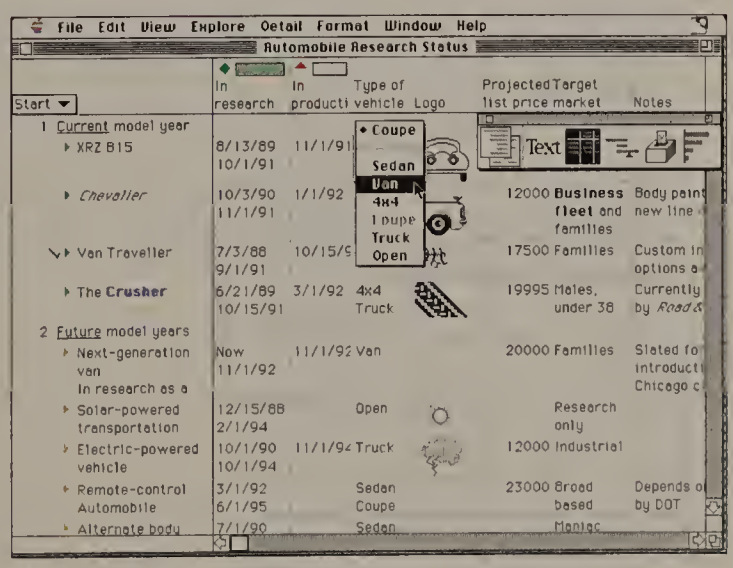

More for the nineties? Fair Witness is an outliner, a table, a smart to-do list, and even a digital ballot box.

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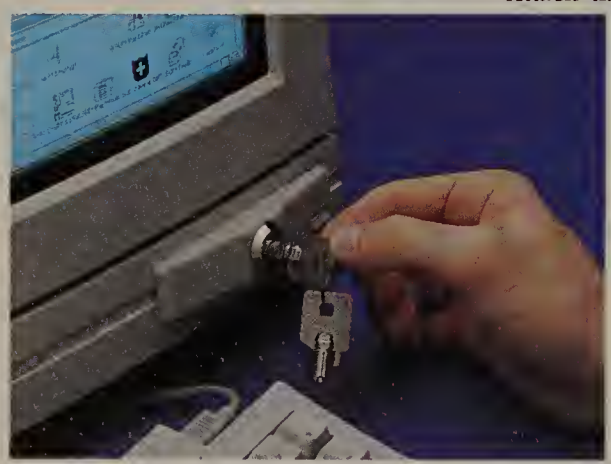

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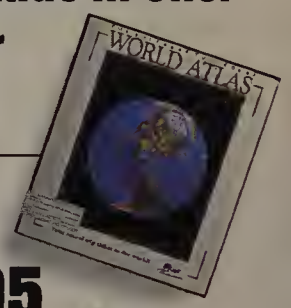

THE SOFTWARE TOOLWORKS

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editor), and even sounds. Fair Witness can calculate duration in date columns and display it in a sort of Gantt-chart view; it can also perform 13 operations on number columns, including sum, average, and count.

Another kind of column is for pop-up lists of common entries. The lists can be linked so that inserting an item from a pop-up list in one column automatically inserts the appropriate item from the linked list in another column. You can create multiple versions of cells in the table (and items in the outliner); they stack up like miniature windows, which you can date-stamp and later flip through.

Fair Witness also has a view for groups to vote on decisions. This feature will be more useful when Fair Witness works across a network. Fair Witness is a complex product, but it has an unusually good manual that tells you not just what each command does but also why you would want to do it. Fair Witness lists for $495 and is shipping. For more information, call Chena Software in Allentown, Pennsylvania, at 215/770-1210.—**D.L.**

VIRUS WATCH

Current viruses, Trojan horses, and worms affecting the Macintosh community.

ZUC C

Type: Virus
First listed in Virus Watch: 10/91
Info: A ZUC clone.
Impact: Nondestructive; infects applications and system files; renders cursor inoperable.

HC

Type: Data Virus
First listed in Virus Watch: 6/91
Info: Infects HyperCard stacks.
Impact: Causes the Mac to hum oddly.

nCAM

Type: Virus
First listed in Virus Watch: 5/91
Info: An nVIR clone.
Impact: Nondestructive; infects applications and system files; can cause crashes.

New Words

From a company known for its Unix and VAX VMS document-creation systems comes a combination word processor, drawing, graphing, and table-building package for the Mac.

Microsystems Engineering's WysiWord puts text, sidebars, graphs, headers and footers, and drawings in frames. Frames can overlap and be anchored to a spot on a page or set to flow with a piece of text. They can also repeat on every page or every other page.

WysiWord's graphs can handle up to three series in scatterplots, pie charts, and bar and line graphs. Graphs can be based on columns of numbers in a WysiWord text frame or an external file, and you can add labels, a legend, and grid lines to them.

The table has some nice features, such as being able to combine any two adjoining cells and shade cell by cell; the frame-based structure makes it easy to add text or graphics next to or overlapping a table. But you can't change the number of cells after you set up a table, and in the first version text in cells can only align to the left.

Last come WysiWord's word processing capabilities. The first version has rather weak writing tools, with no mail merge, no search and replace for text styles, and no style sheets. It does support snaking and parallel columns, and headers and footers that can change in the middle of a document.

Before the end of the year Microsystems Engineering plans an upgrade that will add style sheets, a macro language, mail merge, variables, dynamic numbering, table of contents, and indexing to the word processor. The upgrade will support multipage tables and aligning text in tables to the center or right, and will provide formulas in tables.

WysiWord for the Mac lists for $795 and is only available direct from the publisher. Microsystems Engineering is in Hoffman Estates, Illinois, at 708/882-0111.—**D.L.**

One-Stop Shopping

Years ago the product manager for Microsoft Works said he wished Works had some competition to make Microsoft upgrade Works and make his job more interesting. Well, things should be fascinating now: Works is facing competition from Symantec's GreatWorks, ClarisWorks (from you-guessed-it), and BeagleWorks from Beagle Bros.

Each product has about the same modules—draw, word processor, database, spreadsheet, telecom, and charting—but each product interprets *integrated* somewhat differently. Microsoft Works has very little communication between its modules, each of which creates separate documents; GreatWorks is similar in structure (it adds an outliner and paint tools). In ClarisWorks, the user can combine frames containing any data type anywhere on a page. BeagleWorks takes the best of both approaches: you can create separate documents with each module, copy and paste hot-linked pieces of them into other documents (this is exactly like Publish and Subscribe but doesn't require System 7), and when you click on a pasted-in piece, up comes the appropriate set of tools to edit with. For example, you could paste a drawing into a word processor document, select the

(continues)

GORDON STUDER

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For example, if you trade in your DESKPRO 286e with a color monitor, you can get up to $850 toward the purchase of the world's best-selling 386 SX personal computer, IBM's PS/2 Model 55 SX.

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drawing, modify it with the draw tools, and save the changes back to the original document.

BeagleWorks can split any window in half or quarters; provides 8-bit color in both the paint and draw modes; can automatically wrap text around irregular graphics; and can mix single-column and multiple-column text on one page (it supports snaking and parallel columns). BeagleWorks uses MacWrite-like rulers rather than style sheets for text formatting. It has an impressive collection of charts, including bar and column, area, line, pie, high-low, and combinations. BeagleWorks will list for $299.95.

ClarisWorks' hottest features include a record-and-playback macro facility and linked frames in the word processor that function like low-end desktop publishing. Search and replace, headers and footers, a spelling checker, and other Claris standards are available throughout, and ClarisWorks can share dictionaries with other Claris products. It will list for $299.

Microsoft has not commented on plans to upgrade Works. Claris is in Santa Clara, California, at 408/727-8227. Beagle Bros. is in San Diego, at 619/452-5500.—**D.L.**

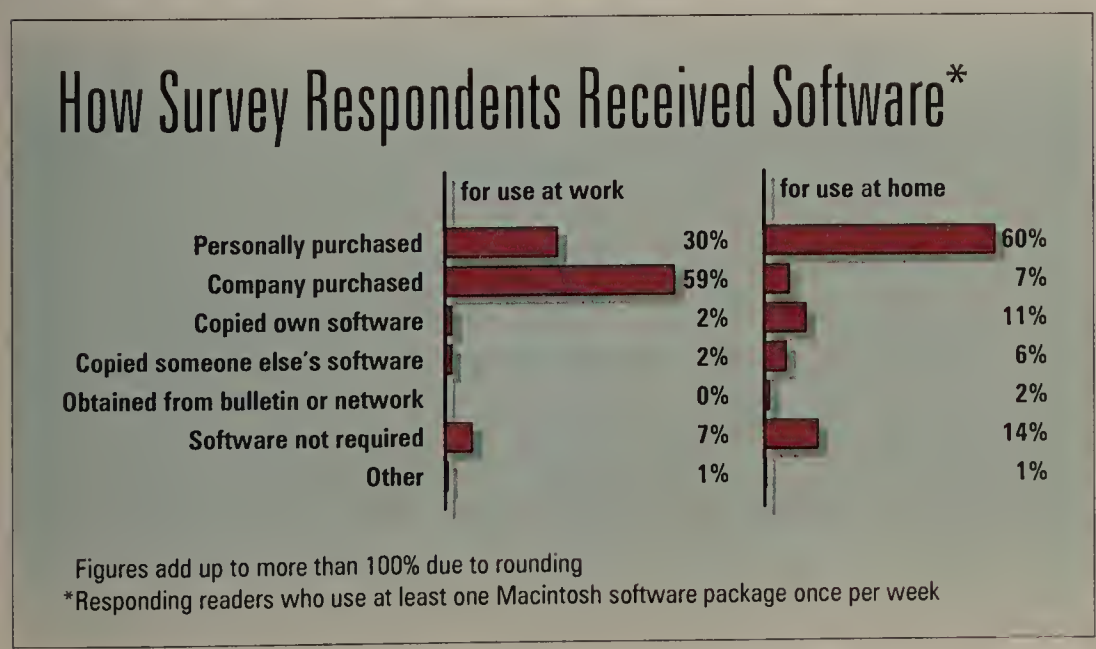
Survey: Software Piracy

This month's reader survey concerns the shady world of software piracy, where mild-mannered businesspeople by day become digital burglars by night. Software piracy is a terrible problem for developers, since the industry annually takes worldwide losses estimated in the hundreds of millions of dollars. Piracy leads software companies to consider adding copy protection to their products, or worse yet, features that are documented only in the manual, since manuals are often not easy to copy.

We asked readers if their organization has an official policy about piracy, and 45 percent of respondents say yes, 38 percent say no, and 12 percent say they do not know, with 5 percent saying they are not currently employed. Among the responding readers whose organization has a policy, 42 percent say that it is always followed, 28 percent say it is often followed, 11 percent say it is sometimes followed, 6 percent say it is seldom followed, and 2 percent say it is never followed.

Among readers who use at least one Macintosh software package once a week or more, 62.4 percent say that none of the software they regularly use is pirated, 18.5 percent say one title is pirated, 7.3 percent say they have two pirated products, 5.6 percent say three, 2.2 percent say four, and 1.7 percent say they use five pirated programs. Another combined 2.3 percent say they have between 6 and 25 pirated software titles.

About 48 percent of responding readers say they strongly agree with the statement, "I usually try to avoid software piracy." Only 5.4 percent strongly disagree with the statement, "Software piracy laws should be strictly enforced." Only about 3 percent strongly agree with the statement, "It's fine to make copies of software products for friends," while 36.5 percent strongly disagree.—**T.M.**



Our survey on software piracy shows that more readers illegally copied software for home use than for use in the office. The vast majority of software was purchased.

TIM KELLY

The BlueMaq Heat Seeker II includes an accelerated Mac SE system board, a monochrome monitor, and a display adapter.

BlueMaq Makes Mac Clone

BlueMaq International has created an accelerated desktop system that's based on the Macintosh SE and looks little like the original. The Heat Seeker II, as it's called, is built into a PS/2-style case and comes with a 14-inch external monochrome monitor, an 85MB hard drive, an 800K floppy disk drive, and an SE system board to which BlueMaq has added its own accelerator board and video adapter board. The accelerator board includes a 25MHz 68030 microprocessor and a 68882 math coprocessor.

The system also has a 101-key ADB keyboard, a mechanical ADB mouse or trackball, a 200-watt switchable power supply, an internal speaker, and an open PDS slot. It includes a SCSI interface, an external floppy drive port, an AppleTalk/printerport, a modem port, and two ADB connectors.

BlueMaq is offering hard drives with capacities of up to 320MB and a SyQuest removable cartridge drive that fits inside an unoccupied drive bay in the Heat Seeker II system box. Shipping now, the Heat Seeker II lists for $6995. For more information, contact BlueMaq in Salt Lake City at 801/975-1726.—**T.M.**

Designed and produced on the RasterOps 24XLi

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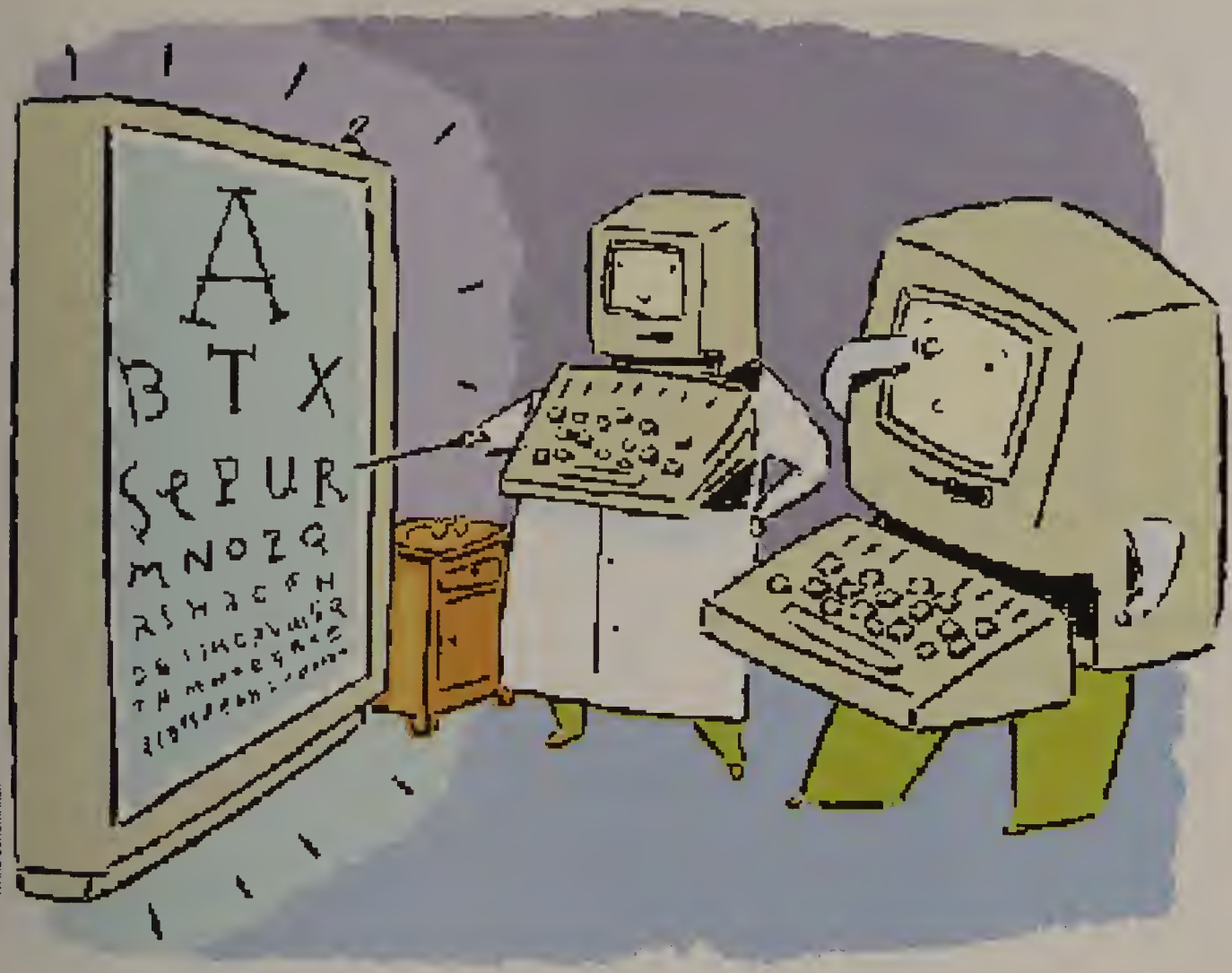


WARD SCHUMAKER

OCR Teaching Your Mac to Read

Eight OCR packages recognized and ranked

by Deke McClelland

Optical character recognition (OCR) software promises a lot. With it and a scanner, the Mac can read documents and understand them as text, not pictures. Once scanned and recognized, those documents are available for editing, formatting, searching, or republishing. You'll never have to retype them again. • Sounds good, but wait. After spending months evaluating eight OCR packages for the Mac, I've got sobering news. If you hired a typist who was no more accurate than the most revered OCR program, that person would be out the door faster than you can E-mail "Her's yur hat, wut's yur hury?" • The sad fact of the matter is that OCR is a tough job for a computer. It has to decipher as many as 100 characters; in any of hundreds of typefaces; set in any number of sizes; whether typeset, laser-printed, typed, photocopied, or faxed. It's quite common for the Mac to misread things that any person would decipher with ease: simple words that are misspelled; letters inserted where

numbers should be; one letter that looks a bit like two letters; two letters, close together, that look like one.

But even though you have to spend some time correcting errors and optimizing an OCR program to perform well, you still save time and energy that you might have spent painfully retyping those pages. If you need to capture just a few pages, OCR might not be worth it, but if you need to capture mountains of pages, it can be invaluable.

Understanding the Recognition Process

Some OCR programs, called *omnifont* programs, are prepared to read immediately; others, called *trainable,* require you to identify each character once; some programs, called *multifont,* can read certain fonts automatically but require training for others. The omnifont packages reviewed here—Caere Corporation's OmniPage and the Typist, Dest Corporation's Recognize, OCR Systems' ReadRight for Macintosh, and Xerox Imaging Systems' AccuText—can read virtually any variety of type, regardless of font or style, within a specific range of type sizes. Omnifont programs do this primarily by applying character-recognition algorithms to scanned documents. A character that forms a complete oval, for example, is an *O;* an oval with a break in its right-hand side is a *C.* This is fine as far as it goes, but the real strength of omnifont OCR is in distinguishing individual characters in the first place. How does an OCR program separate tightly kerned characters or ligatures, such as *fi* and *æ?* And how does the program know that an *m* is an *m* and not *rn?*

The best omnifont packages contain a pinch of artificial intelligence, allowing them to identify single characters as well as groups of characters and even whole words. AccuText recognizes words by shape, distinguishing *shell* from *spell* based on the placement of ascenders (the portion of a letter that extends above the top of characters like *e* and *x*) and descenders (the portion of a letter that falls below the imaginary line on which characters sit). Both AccuText and Recognize check identified words against online dictionaries, automatically changing a word that they originally saw as *rni5talce* to *mistake.* And OmniPage learns as it goes, cruising through easy-to-read groups of characters on the first pass and using these recognitions to decode the tough characters the second time around.

The trainable packages—Inovatic's ReadStar II Plus for the Macintosh and Olduvai Corporation's Read-It Pro and Read-It Personal—must be taught to read before they can begin recognizing a page. When the program doesn't recognize a character, you must identify it by typing the correct character on the keyboard. The program then assembles a table of characters for the scanned document and saves it as a font library. Both Read-It Pro and Read-It Personal come equipped with collections of predefined font libraries, qualifying them as multifont packages. The font libraries enable these programs to recognize text produced by typewriters and specific typefaces from many personal computer printers. However, multifont packages must still be trained to recognize any typeface not included in their predefined libraries.

ROSEMARY WILTON

OCR Input Options Pictured clockwise from the top are the Dest Personal Scan Kit, the Typist, the Lightning Scan/40, and the Abaton TranScribe 300 scanner—all offer ways to scan in text for recognition.

Picking the Best Product

To a user, though, how a program recognizes text isn't as important as how well it does so. Regardless of your specific requirements, you'll benefit most from the OCR package that reads the widest variety of documents and makes the fewest errors (see "Getting an Accurate Reading").

Coming in a strong second on my list of what to look for is ease of use. Does the program provide a straightforward interface, or do you have to read the manual before you can so much as scan a document? Also important, does the program provide text-editing tools? The two most useful are prerecognition text-editing tools that check the spelling of every word before displaying the finished document on screen and postrecognition text-editing tools that enable you to search for errors after the recognition process has been completed.

Lower-Priced OCR Options

If you already own a flatbed or sheet-fed scanner, you can buy into OCR for the price of the software alone. The multifont/trainable Read-It Pro and the omnifont package ReadRight for Macintosh both retail for just under $500. Of the two, ReadRight offers the more straightforward interface. After scanning a document, ReadRight may be set to automatically dissect the page into readable text blocks. Alternatively, you may exclude graphics and identify text blocks manually using a set of on-screen tools. I would have liked this product more if I could have specified a desired number of columns up front, or if I could have manually adjusted the size of the text blocks to include additional characters in a paragraph or create new blocks to incorporate additional paragraphs after ReadRight's automated dissection cycle. Also, I was bothered by little inconsistencies when using the software. For example, when adjusting the scanner settings, a Brightness value of 100 percent is the darkest setting, 0 percent is lightest—the inverse of accepted scanning software conventions.

Read-It Pro is more confusing. You cannot manually adjust text areas if you have set the program to automatically identify text blocks and

	AccuText 2.0	OmniPage 2.12	Read-It Pro 3.0	ReadRight for Macintosh 1.0	ReadStar II Plus for the Macintosh 1.08	Recognize 1.0	Read-It Personal 2.1	Typist 1.0
Company	Xerox Imaging Systems	Caere Corporation	Olduvai Corporation	OCR Systems	Inovatic	Dest Corporation	Olduvai Corporation	Caere Corporation
List price	$799	$695	$495	$495	$750	$695	$295	$695
Minimum system requirements	Mac II, 4MB	Mac II, 4MB	Mac Plus, 4MB	Classic, 4MB	Mac Plus, 2MB	Mac Plus, 1MB	Mac Plus, 1MB [1]	SE, 4MB
Compatible [2] scanners	B, C, G, K, M, R	A, B, C, E, H, J, K, M, O, P, R	A, C, E, H, K, M, U, V	A, C, F, K, M, N, S	B, C, D, E, K, M, P	C, H, K	U, V	W
Recognition system	omnifont	omnifont	multifont, trainable	omnifont	trainable	omnifont	multifont, trainable	omnifont
DOCUMENT PREPARATION								
Preview mode	●	○	●	●	○	○	○	○
Adjustable brightness/contrast	●/●	●/○	●/○	●/○	●/●	●/○	○/○	●/○
Independent scan window	●	○	●	●	●	●	●	●
Number of view sizes	5	1	4	3	2	10	2	1
Scans partial area	●	●	●	○	○	●	●	○
Orientations (portrait/landscape)	●/●	●/●	●/●	●/●	●/○	●/●	●/○	●/●
Page-size settings (letter/A4/legal)	●/●/●	●/●/●	○/○/○	●/○/●	●/●/●	●/●/●	○/○/○	○/○/○
TEXT RECOGNITION								
Column settings (single/multiple)	●/●	●/●	○/○	●/●	○/○	●/●	○/○	●/●
Automatic text-block recognition	○	●	●	●	○	○	○	○
Text-block selection/sequencing	●/●	●/●	●/●	●/●	●/○	○/○	○/○	○/○
Manual block-size adjustment	●	○	○	●	○	○	●	○
Type sizes recognized (smallest/largest; in points)	8/24	8/72	8/72	8/72	6/24	8/24	8/72	6/72
Optional tab delineation	●	●	○	●	○	●	○	●
Letter/number exclusion	●/●	○/○	○/○	●/●	○/○	○/○	○/○	○/○
Mailing list/ table support	●/●	●/●	●/○	●/●	○/●	●/●	○/○	○/●
Retains formatting (character/paragraph)	●/●	○/●	○/○	●/●	○/○	○/●	○/○	○/○
Draft-quality dot-matrix recognition	●	only with OmniDraft	○	○	○	○	○	●
Supported text-file formats [3]	a, b, c, d, i, j	a,b,d,h,i	a, d, f, g, h, k	a, b, d, e, f, g,	a	a, d, f, g, h, k	a	d, e, f, g, h, i, j

(table continues on page 173)

[1] Program required 2MB to run during testing. [2] Flatbed/sheetfed models: A=Abaton, B=Agfa Focus, C=Apple, D=AST Turbo Scan, E=Canon/MacScan, F=Chinon, G=Datacopy, H=Dest, I=Epson GT, J=Fujitsu, K=HP ScanJet, L=Howtek, M=Microtek, N=Panasonic, O=Pentax, P=Ricoh, Q=Sharp JX, R=Siemens, S=The Complete PC, T=Toshiba. Hand-held models: U=LightningScan, V=ScanMan, W=Typist. [3] a=ASCII, b=RTF, c=SYLK, d=MacWrite, e=WriteNow, f=MS Write, g=MS Works, h=MS Word, i=WordPerfect, j=HyperCard, k=AppleWorks.

graphics in a document. If you select text blocks manually, you cannot resize them later, nor can you move them or change the order in which the program reads them. Read-It Pro's training procedure is unnecessarily complicated, relying on a series of Confidence Level options that don't immediately make sense. The most complete explanation in the manual reads, "Confidence Level gives you the idea of how much you can trust the recognized character is correct comparing it with a similar character in the Type Table"—and I found that only after reading five other pages referenced on that topic in the index.

But as much as I dislike the way Read-It Pro is organized or documented, in my tests it recognized documents more accurately on average (91.08 percent) than ReadRight (90.48 percent) and tended to be faster. It performed most remarkably when recognizing poor-quality photocopies and small, irregular text, such as legal contracts and dense tables.

Unfortunately, both of these programs share a common problem: the average accuracy of each program hovers around 90 percent. This may not sound like much of a problem, but a 10 percent error rate means about one incorrect character in every other word. In particularly difficult cases, entire strings of text are

not recognized. And because none of these applications are capable of recognizing entire words, the mistakes are random and inconsistent, making it difficult to search for and correct inaccuracies. Of the three budget packages, only ReadRight offers a postrecognition error-checking feature, complete with a list of suggestions for misspelled words, much like a spelling checker found in a typical word processor. Unfortunately, recognition errors are far more random and unusual than spelling errors. ReadRight's error checker, like most spelling checkers, can identify the error but can't make any useful suggestions about how to correct it. You have to search through the original document and determine the proper substitutes for misspellings.

Higher-Priced OCR Options

If you're looking for consistent performance across a wide range of document types, spending a little extra money and buying a top-of-the-line OCR application to go with your page scanner might solve your problems; but beware, paying more doesn't always mean better performance or accuracy. ReadStar II Plus, OmniPage, and AccuText can each be had for between $695 and $1000.

For $750, ReadStar II Plus offers the worst text-reading capabilities of the flatbed-compatible programs (77.61 percent average accuracy). It is trainable but has no predefined type libraries, so it can't even read Courier without your help. Worst of all, once you create and save a character library, you can add characters but you can't go back and edit incorrectly recognized characters. You must create a new table or accept the errors. Finally, the manual is poorly translated from French (I have no idea what "Selecting the function Table Off amounts to write out the vertical lines of a table" means), and it has no index.

THE FUTURE OF OCR

By the time you read this, many new OCR products should be out on the market. Caere has announced the Typist 1.1, which will provide System 7 compatibility, variable resolution control, and support for the Clipboard. You will also be able to open the Typist DA using system extenders such as Suitcase II or MasterJuggler. Best of all, the manual has been rewritten, offering more detailed instructions and much-needed scanning advice. It will be free to registered users of the Typist 1.0. An upgrade to OmniPage will also make that program System–7 compatible. In August, Caere will announce OmniPage 3.0, a System 7–savvy upgrade that will also incorporate OmniDraft and OmniSpell. OmniPage 3.0 will be available for $695. At the same time, the Typist will be upgraded to the Typist Plus, adding gray-scale–editing features and a new SCSI connector box to the product, also available for $695. In October, Caere plans to announce OmniPage Professional 2.0, a $995 version of OmniPage that will add gray-scale editing, an enhanced transitional editor, a trainable-text option that will allow automatic substitution of certain characters, deferred processing, multiple user-definable zones, and clipping (the ability to combine several different areas of text into one file). OmniPage Pro will also take advantage of new AccuPage technology incorporated into the HP ScanJet IIc to increase recognition accuracy.

Olduvai's Read-It Pro 3.0 is already System 7–compatible; version 3.0a will be System 7–savvy, adding Balloon Help and the ability to import scanned text directly into any word processor that supports AppleEvents, such as WordPerfect and MacWrite Pro. Sources at Olduvai also claim that the upgrade will be measurably faster. Read-It Personal 3.0 will provide the automatic font-recognition capabilities of Read-It Pro in a stripped-down version exclusively for users of hand-held scanners. The upgrade fee for registered users of Read-It Personal 2.1 will be $49. Better yet, $79 will buy an upgrade to Read-It Pro.

WordScan and WordScan Plus are two new Mac products from Calera, maker of the ultra-high-end TopScan OCR software (part of the $30,000 Compound Document Processor system for Sun workstations and Macs). For $595, WordScan looks prepared to give OmniPage and AccuText a run for their money, sporting fax and draft-quality dot-matrix recognition capabilities, and delayed processing so the computer can recognize pages at night or some other time when you don't need access. At $995, WordScan Plus breaks new ground. Its multiple-job–processing feature breaks groups of pages into separate files, further automating large tasks. You can also set WordScan Plus to reformat documents using style sheets and automatically identify graphics and store them on disk. Both products require machines with 68020 microprocessors and 4MB of RAM.

If your scanning desires are scarcely so lofty, consider something in the under-$400 range. TextScan 4.0 from Prism Enterprises provides a user-editable dictionary, basic omnifont capabilities, and an intuitive training function for hard-to-read typefaces. And for $99, Prism's ReadingEdge will offer omnifont recognition, an optional training mode for hand-held scanners, and a 40,000-word dictionary.

From Logitech, makers of the ScanMan hand-held scanner, CatchWord Pro enters Read-It's territory; it will offer support to both hand-held and flatbed scanners. CatchWord promises better-than-average hand-held recognition, it will have a built-in text editor, and it will be able to work with less than 2MB of RAM.

Finally, if you're in the market for a hardware/software bundle, you may want to wait for the Character scanner from Computer Friends. Like the Dest Personal Scan Kit, which uses the same engine, the Character scanner doubles as a sheetfed and hand-held device. Up to 10 loose pages can be loaded into the sheet feeder. To scan pages from a book or magazine, snap off the sensor element and move it over the document, taking in the full 8½-inch page width in a single drag. Its only difference from the Personal Scan Kit is the price—$899, roughly $100 less than the Dest model—and the software, which is Read-It Pro instead of Recognize.

And CTA, vendors of TextPert and ScanReader, will be offering the TextPert Developer's ToolKit, an OCR engine that will enable software developers to integrate OCR capabilities into their own software products. The tool kit will be announced in August, will offer automatic and trainable OCR technology, and will be available in single-user and OEM configurations.

OCR FEATURES (continued)

	AccuText 2.0	OmniPage 2.12	Read-It Pro 3.0	ReadRight for Macintosh 1.0	ReadStar II Plus for the Macintosh 1.08	Recognize 1.0	Read-It Personal 2.1	Typist 1.0
IMAGE RECOGNITION								
Automatic picture exclusion	○	●	●	●	○	○	○	●
Line-art/halftone settings	●/●	●/●	○/○	○/○	●/●	○/○	●/○	●/●
Variable halftone pattern support	●	○	○	○	●	○	○	●
Number of supported image-file formats [4]	l, m, n	n	m, n	n	n, o	l, m, n	m, n	m, n
PRODUCTIVITY TOOLS								
Multiple-page support	●	●	○	●	○	●	○	●
Automatic-feeder setting	●	●	○	●	○	○	○	○
Custom-settings files (save/load)	●/●	●/●	●/●	●/●	●/●	○/○	○/○	○/○
Pauses/resumes during scan	●/●	○/○	○/○	○/○	○/○	●/●	○/○	○/○
Automatic skew correction	●	●	○	●	○	●	○	●
Automatic noise filter	●	●	●	○	○	●	●	●
Context-sensitive character recognition	●	○	○	○	○	●	○	○
Automatic character-learning	●	●	●	○	○	●	○	●
Postrecognition spelling checker	○	only with OmniSpell	○	●	○	○	○	○
Postrecognition error checker	○	●	○	●	○	○	○	○
Postrecognition search-and-replace	○	●	●	○	●	○	●	○
User-definable dictionary	●	●	○	●	○	○	○	○
Number of language dictionaries	10	1 (13 more available)	1	1	0	1	0	0
Dictionaries (legal/medical)	○/○	●/●	○/○	○/○	○/○	○/○	○/○	○/○

[4] *l= MacPaint, m=PICT, n=TIFF, o=FOTO.*

OmniPage relies on character-shape analysis to recognize one letter or number at a time. The program then sets aside each recognized character in memory, where the program assembles an alphanumeric codebook customized to the current document. If OmniPage can't interpret a character the first time, it returns with codebook in hand and tries again.

The technique is extremely reliable for reading clean type composed of unbroken lines—such as that found in magazines, sharp photocopies, and typewritten pages—in which it is easy for the OCR program to clearly identify each character. Type that is light or poorly scanned can be difficult to recognize, since broken lines with missing pixels make it difficult to identify where each character begins and ends. OmniPage was the only program to perfectly recognize any document in the testing cycle. It perfectly recognized the typewritten document. And OmniPage's performance can be further improved by using add-on packages. For $100 retail, OmniSpell can be installed into OmniPage, providing postrecognition word correction. Unlike the spelling checker provided with ReadRight, OmniSpell makes suggestions that address word-recognition errors as opposed to text-input errors. For example, if you were typing, you might misspell the word *associate* as *asociate* or *assotiate*. However, an OCR package might incorrectly recognize the same word as almost anything, from *a55ociale* to *aee0Ciats* to *essaclele*. OmniSpell is designed to catch and correct just this sort of error. Another extension, OmniDraft (another $100), enables OmniPage to read draft-quality pages printed from an ImageWriter or another dot-matrix printer. AccuText and the Typist are the only other packages with this capability. Without it OCR packages are confused by the gaps between dots that make up a character, so that a single letter is seen as four or even five characters.

Unfortunately, OmniPage's character-comparison capabilities are not infallible. When scanning inconsistent or low-contrast text—such as that in many faxes, photocopies, newspapers, and contracts—OmniPage cannot locate enough obvious characters with which to establish a universal codebook. In extreme cases, such as the contract used in my tests, you're better off typing the document from scratch (in this test, OmniPage had a dismal 73.81 percent accuracy rating).

For this reason I prefer AccuText. Though it can be two to three times slower than OmniPage, it reads almost any document at least 90 percent accurately, regardless of print medium or paper quality. AccuText includes

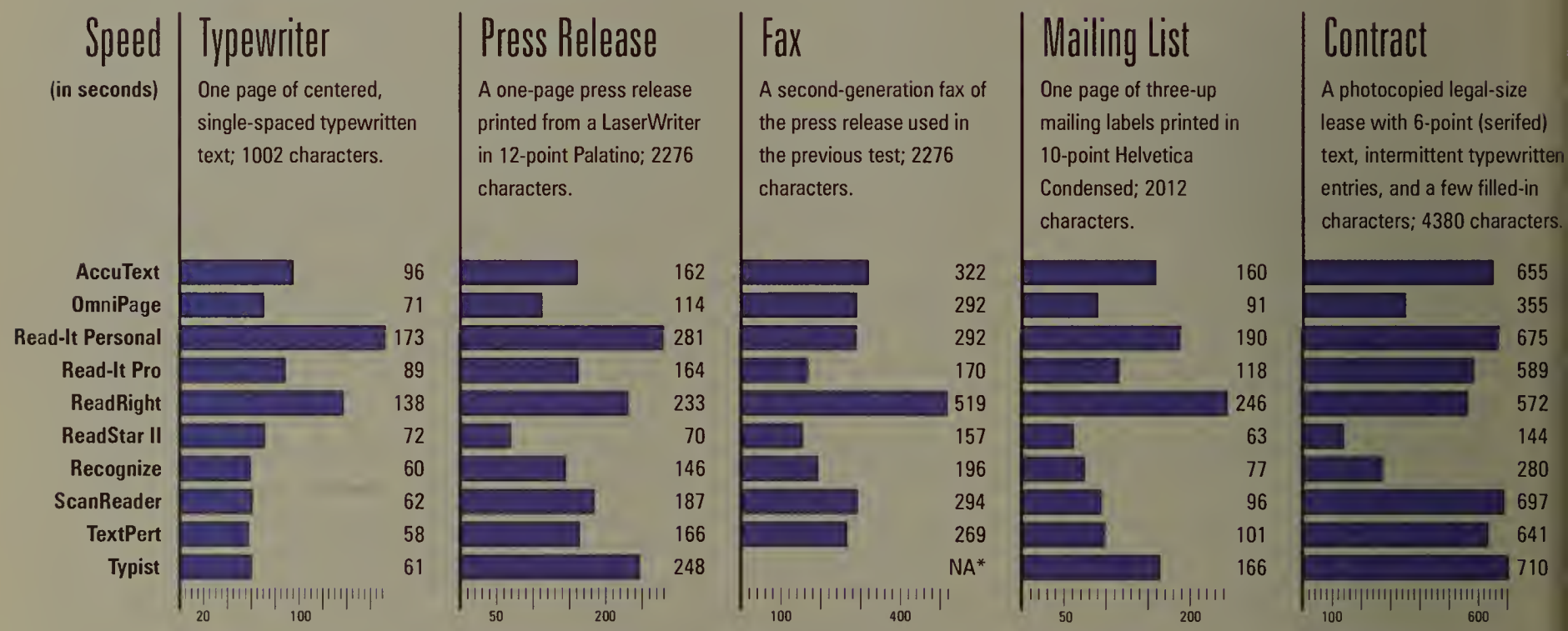
ten dictionaries of more than 50,000 words each. Each dictionary covers a different language that uses the Latin alphabet—English, Spanish, German, Italian, and so on. These dictionaries include rules of grammar and number placement. For instance, a period is allowed to be followed by a space and a capital letter or no space and a number; *Da, O',* or *Mc* must be followed by a capital letter; a number is allowed to precede *st, nd, rd,* or *th,* while a suffix such as *ed, ion,* or *ist* follows only letters.

As AccuText skims a page, it grabs words and compares them to entries in the dictionary. Like OmniPage, AccuText applies its early discoveries to decode more difficult words as it makes repeated passes over a document. AccuText guesses at a character's identity based on the characters that surround it. If, for example, AccuText incorrectly identifies the series of characters *MCI Mail,* as *MO Nail,* it's likely to make the same incorrect guess again and again. AccuText's tendency to repeat mistakes reduces its accuracy rate, but it makes your job easier. A single search-and-replace operation (using a separate word processing application) can result in five or six corrections. You have to use a separate editing program, though; AccuText doesn't come with postrecognition tools.

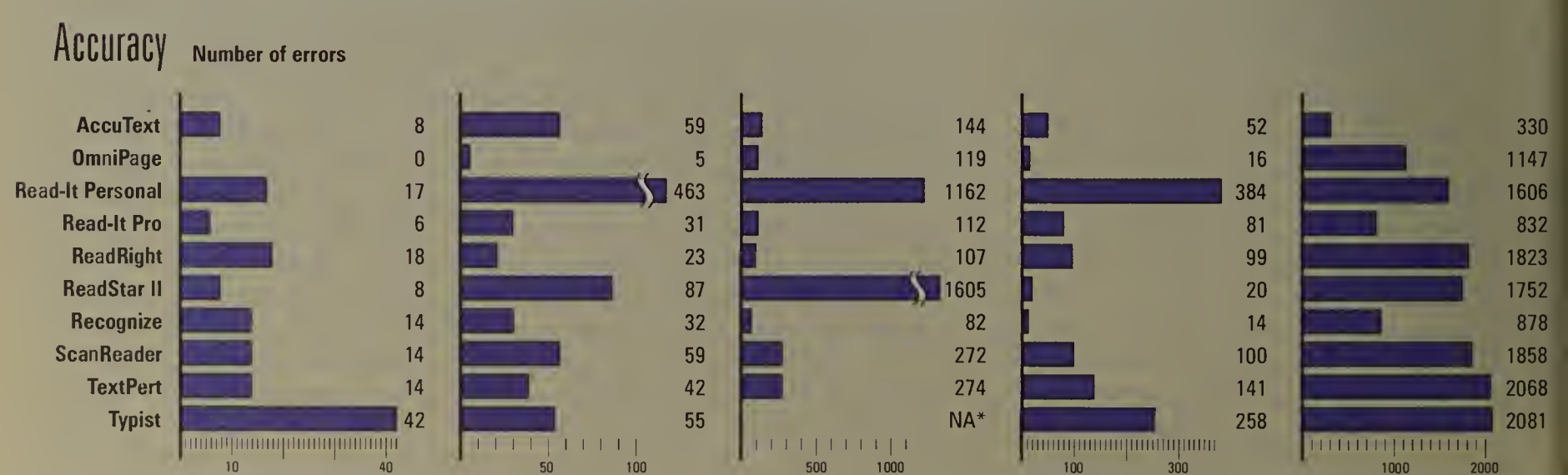
AccuText also re-creates type style, alignment, and other formatting attributes, so that the electronic version of a document matches the hardcopy original as closely as possible. Besides looking pretty, a formatted document facilitates the manual correction cycle, offering landmarks—headlines, bylines, captions, and other specially formatted text—that help you locate scrambled words from the original page.

Checking words and confirming styles reduces AccuText's speed when it's scanning single-page documents.

Getting an Accurate Reading



Speed values include both scanning and recognition time. All software was tested for speed after it had been trained. The trained character tables created for the press release were used in computing the speed and accuracy values for the fax document, since the two pages contain identical information. However, as the results show, training tables derived from a document are not always applicable to a copy of the same document.



The brightness setting at which a document is scanned has a profound effect on the accuracy of the OCR software. If a character fills in, it becomes unrecognizable; if it breaks up, it is read as more than one character. For this reason, extreme care was taken to determine the optimal brightness for each document for each OCR package. Some programs, most notably Typist, demonstrated problems when working from reflective surfaces such as fax paper or slick magazine stock.

But AccuText's tempo quickens considerably when it's scanning second, third, and fourth pages, though it never quite matches the per-page speed of OmniPage. Still, speed for accuracy is a sweet trade, since your time is more valuable than your computer's. And if you throw in even/odd page collation that works with scanners that have automatic document feeders, such as the Xerox Datacopy 830 and HP ScanJet Plus, you've got yourself a page-reading robot.

Getting Started on a Budget

So far my recommendations assume you already own a decent page scanner. But if you don't, you have several options.

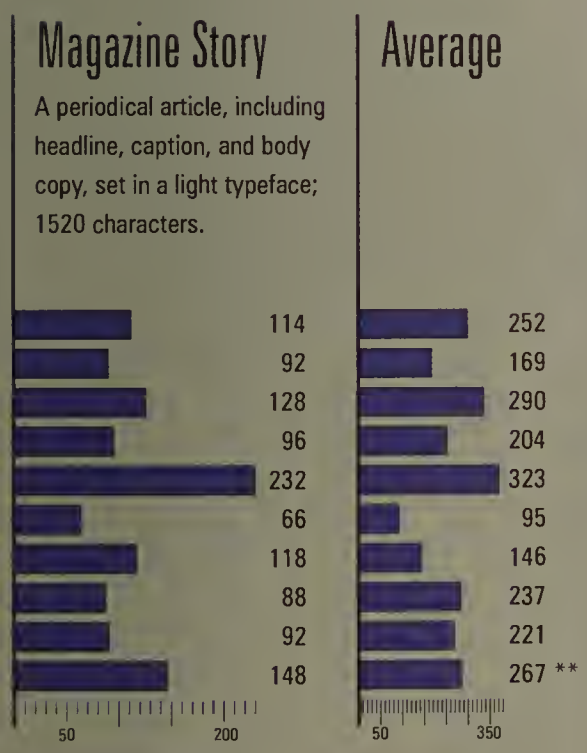
One school of thought proposes the hand-held scanner, an inexpensive device that is slightly larger than a full-size electric razor and records a document in strips when dragged along the surface of a page (for more on hand-held scanners, see "One in the Hand," *Macworld*, June 1991). Two applications, Read-It Personal and the Typist, are designed specifically for use with hand-held scanners. For $295, Read-It Personal includes only software, requiring you to lay out additional funds for hardware in the form of the directly supported LightningScan 400 from Thunderware ($495) or Logitech's ScanMan Model 32 ($499). For $695, the Typist includes both software and hardware, making it a better deal for someone without any OCR equipment.

Unfortunately, both hand-held recognizers rank among the least-accurate scanning programs tested, largely because hand-held scanners lack the precision needed to meet the requirements associated with OCR.

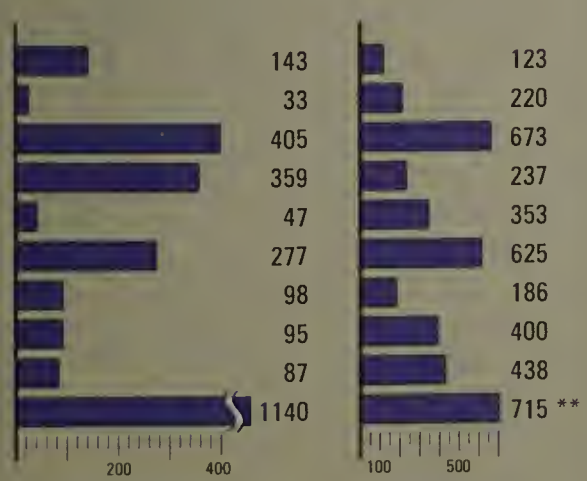
Getting Started with Style

The best bet for your money is the Dest Personal Scan Kit. For less than $1000 you get a great little sheetfed scanner bundled with the absolute underdog OCR product of the year, Recognize. This program combines the context-sensitive word-recognition capabilities of AccuText, the speed of OmniPage, and the intuitive interface of ScanReader, all in the only package that runs reliably on a 1MB system with a 68000 microprocessor. In my tests Recognize ranked in overall accuracy only behind AccuText. I mean, how can you beat it?

If I have any reservation about the Dest Personal Scan Kit, it is the scanner itself. Although it works splendidly for small jobs, for longer documents there is just no substitute for a flatbed scanner with an automatic sheet feeder. Automatic sheet feeders can handle larger documents (20 to 50 pages compared with the Scan Kit's 10-page maximum), and when you use a sheet feeder, each page is laid completely flat before the scanning process begins, preventing the distortion that sometimes results from scanning a page as it is fed, one line at a time, as with the Dest scanner. For $1590, the Abaton TranScribe 300 includes an Apple-compatible gray-scale scanner, a 20-page document feeder that works even without support from the OCR package, and a graphic-scanning utility. Better still, Microtek's MS-II ships with a 50-page document feeder and a small price tag of $1195. Both scanners are bundled with OmniType, a stripped-down version of OmniPage that does not support OmniSpell or OmniDraft.



* Typist was unable to recognize a second-generation fax.
** Average based on five tests.



* Typist was unable to recognize a second-generation fax.
** Average based on five tests.

MW EDITORS' CHOICE

There's no sense in purchasing OCR on a whim. If you have only a few pages to scan every other month or so, I strongly suggest you type them in or pay the nominal fee to have them scanned in at a local service bureau. However, if you have stacks and stacks of pages that you need to scan and manipulate on a regular basis, OCR is worth the expense and the time required to learn the software.

If you already have a scanner and own a Macintosh with a 68020 or above and 4MB of RAM, I wholeheartedly recommend AccuText. It is easy to use, well documented, and what it lacks in speed it makes up for in accuracy. If you have not yet purchased a scanner and are looking for great value and great performance, buy the Dest Personal Scan Kit bundled with Recognize, the product that ranked second in overall accuracy (94.40 percent) just behind AccuText (95.13 percent).

Now go on, get out of here. The sooner you get to work, the sooner you'll get those piles of paper off your desk, into your computer, and back to the recycling plant where they belong. ■

See *Where to Buy* for contact information.

***Deke McClelland's** recent books include* Canvas 3.0: The Book *(Peachpit Press, 1991) and* Everything You Need to Know about Macintosh System 7.0 *(Sybex, 1991). He used OCR to create a comprehensive database for* The Encyclopedia Macintosh *(Sybex, 1989).*

For high-capacity backup needs we recommend DAT or 8mm drives such as the APS Archive Python (top), FWB hammerDAT 2600, Third Wave DATadrive 1.3, PCPC JetStream, and Tecmar THS-2200 (bottom).

Fast-Forward Storage

Higher capacities and lower prices spell good news for tape-drive customers

BY TOM NEGRINO

Everywhere I look, my gaze is blocked by boxes of tape drives. Just a few short years ago, only a handful of these drives were available for the Macintosh. This year, Macworld Lab speed-tested more than 50 tape drives. From a handful to a truckload, it's called progress. And it has paid off for the consumer—tape drives have undergone the kind of free-fall price plunge associated with RAM and hard drives.

Tape drives have joined hard drives as commodity items. The products are more alike than they are different. And as with any commodity, price should be a major factor in your buying decision. Other important issues to consider are the backup capacity you need; the vendor (are you comfortable buying via mail order, or do you prefer buying products from a local dealer?); and the backup software that comes with the drive. In addition, you need to know the differences between the various types of tape drives—DC2000, DC6000, Teac, digital audiotape (DAT), and 8mm helical scan drives.

The DC Family

The DC2000 tape format, long a standard for tape backup, has lost its edge. Only three companies sent us DC2000 drives to test, and it's not surprising that two of the drives, the Tecmar QT-Mac80 and the Fifth Generation Systems Fastback Tape, were among the best DC2000 drives we reviewed last year (see *Macworld,* November 1990). Both these drives use a 3M mechanism that lets them back up 80MB or (with extended-length tape) 120MB, with passable speed. The third drive we received, the Apple Tape Backup 40SC, is based on an older 3M DC2000 mechanism, which holds less data than nearly every other drive and turned in the worst times in our speed tests. (In the time since our tests were run, Apple has decided to discontinue the Apple Tape Backup 40SC.) I suggest you stay away from purchasing a DC2000 unit as the majority of other drives perform better.

In sharp contrast to the fading DC2000 format, the DC6000 format still offers a challenge to the digital-tape formats, like DAT and 8mm, even though it is based on older, analog tech-

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nology. In case you're wondering, in last year's tape roundup we referred to this tape format as DC600. But the standards committee governing the format changed the name, and we've followed suit.

The DC6000 drives use larger cartridges than do the DC2000 drives. DC6000 drives come in two styles, one with capacities of 150MB and (with extended-length tape) 250MB, and another terrific unit with capacities of 320MB and, again with an extended-length tape, 525MB. As we were going to press, Tandberg Data and Tecmar both announced a 1-gigabyte DC6000 drive, which is expected to ship by this fall. Tapes for the DC6000 drives cost about $35 each.

Good 250MB DC6000 units can be had from Optima Technology, Relax Technology, and Peripheral Vision Storage. The 525MB drives from Tandberg Data, Sankyo, Legacy Storage Systems, and Optima are very fast and hold enough data to back up all but the largest file servers. The DC6000 drives are noisier than the other types of tape drives, but if you need high capacity, the noise shouldn't deter you from taking a serious look at the DC6000 format.

Teac Drives

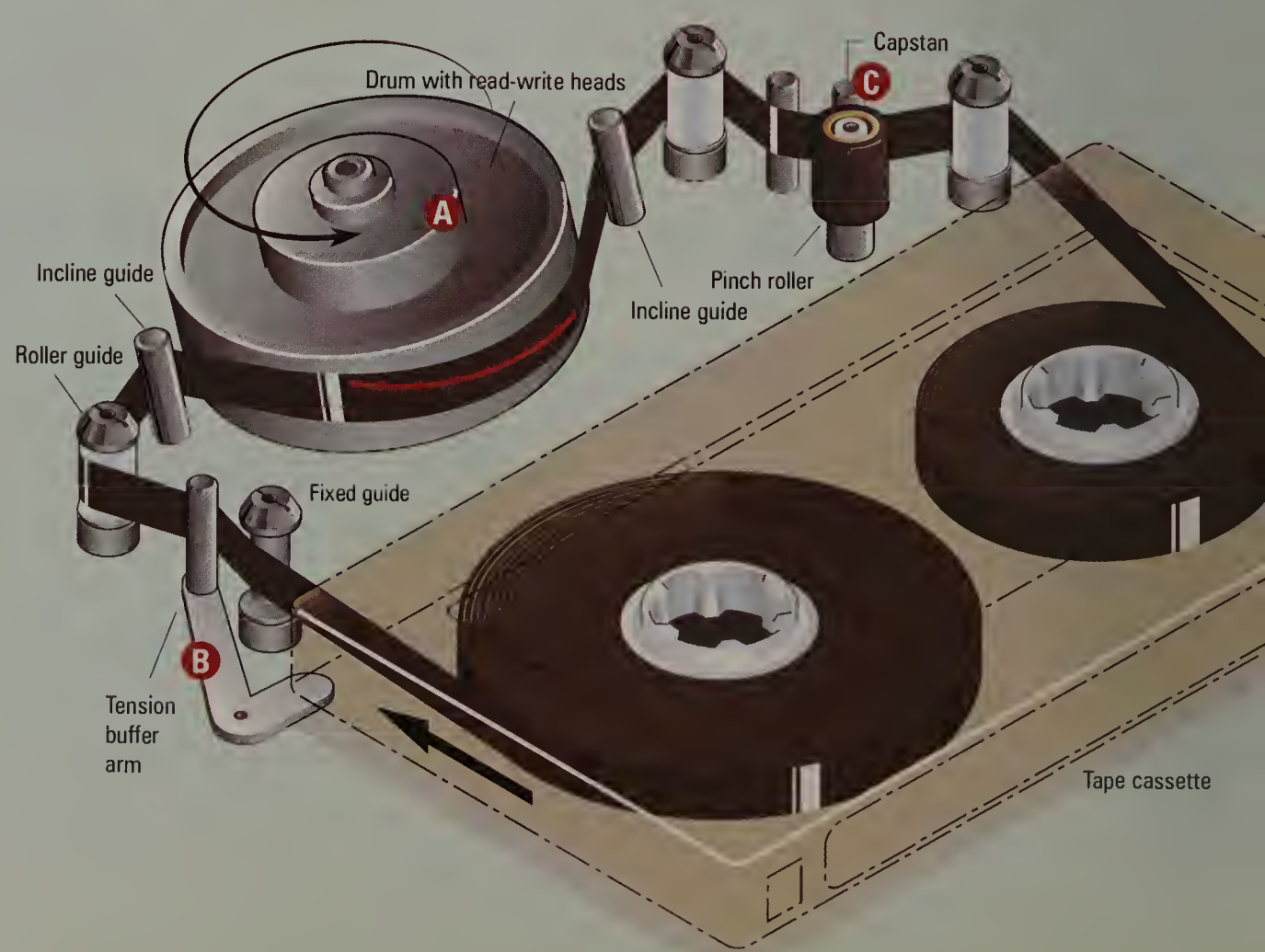
The Teac family includes three different mechanisms, one for backing up 60MB, one for backing up 150MB, and one for backing up 600MB of data. Teac data cassettes look a lot like audiocassettes, but closer inspection reveals a much-higher-quality fit and finish, which makes the Teac data cassettes more reliable than audiocassettes. Each Teac backup mechanism uses a different kind of cassette, and higher-capacity models can read, but not write, the lower-capacity formats. For example, a 600MB Teac drive can read tapes made on a 60MB or 150MB unit, but the smaller drives are stumped if presented with a tape recorded in the 600MB format.

The Teac 60MB format is quickly losing popularity among manufacturers, since the 150MB mechanisms don't cost much more than the 60MB units. The more aggressive companies are passing this advantage on to the consumer, selling 150MB drives for only about $100 more than 60MB drives. Even if you don't yet need the extra capacity, it's worth spending the extra dollars to get the Teac 150MB drive's superior performance. Only two manufacturers, CMS Enhancements and Procom Technology, sent 60MB drives for us to test.

The Teac 150MB mechanism is a top choice for personal backup or as a tape unit for a small business. First, the 150MB capacity fits well with the hard drive size that most people have. Second, the Teac drives have been available for a

How a Helical Scan Drive Works

Both DAT (digital audiotape) and 8mm tape drives work more like standard videocassette recorders than they do like cassette tape players. In most tape drives, a read-write head pushes against a tape and reads or writes data as the tape spins past. DAT and 8mm drives are much more complex because they are designed to write as much data as possible on a tape—a process that requires more exact tape positioning. On DAT and 8mm drives, the tape moves slowly across a diagonally mounted spinning drum (A). A tape holds more data when the data is written diagonally rather than longitudinally. The drum has up to four read-write heads that read and write data to the tape. The tape's motion is controlled by a series of guides and rollers that ensure stable and consistent head-to-tape contact. A tension buffer arm (B) absorbs changes in the tension of the tape as it moves, thereby relieving stress on the tape as it moves through the drive. A capstan roller (C) controls the speed of the tape while the drive is reading or writing data.



long time and are reliable and fast. The tapes cost about $25 each. Many manufacturers offer Teac 150MB drives, and price and the included backup software should be your primary criteria for choosing among them.

Finally released after two years of gestation, tape drives based on the Teac 600MB unit are just starting to appear. We reviewed drives from MicroNet Technology and from Alliance Peripheral Systems (APS). (The MicroNet MT-600 arrived too late to be included in our official test suite.) Both companies' 600MB mechanisms are faster than their 150MB mechanisms, and the larger capacity makes them good choices for archiving big graphics files and backing up file servers and medium-size networks. Other manufacturers, such as CMS and Procom, have announced that they will have Teac 600MB drives available by the time you read this.

Helical Drives

To back up a huge file server or a whole network every night, you need a fast tape drive with a very large capacity. Helical tape drives are just what the doctor ordered. They're called helical because the tape wraps around a drum with spinning read-and-write heads that inscribe a diagonal path across the tape. Helical drives come in two flavors, both of which are based on consumer tape formats. DAT drives are based on the digital-audiotape format and hold up to 2.6GB of data. (An exception is MicroNet's MD-5000, which holds 5GB of data, thanks to a compression scheme; see "More Data Less Space.") The 8mm drives are based on 8mm videotape and hold as much as 5GB of data.

Relatively uncommon the last time Macworld Lab surveyed tape drives, DAT drives have taken the market by storm this year. Virtually every manufacturer of tape drives offers a DAT unit, and most of them are based on one of a few mechanisms. The Wangtek DAT mechanism, used by Legacy Storage Systems, MacProducts USA, PLI, Tallgrass Technologies, Tecmar, and Third Wave Computing, holds 1.3GB of data, as does APS's Archive Python mechanism. The WangDAT 1300 mechanism also holds 1.3GB, while the WangDAT 2600 mechanism holds 2.6GB of data. ADIC's MacBack DAT drive, the only 1.3GB unit we reviewed that uses a mechanism from Hewlett-Packard, ran a bit more slowly than the other DAT units.

Performance among all the DAT mechanisms is very similar. These units are the fastest performers of all tape drives. The WangDAT 2600 mechanism wins the overall speed competition by a nose, but the other drives are close behind. Several manufacturers, including APS, MicroNet, and FWB, offer units with mechanisms from both Archive and WangDAT.

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Good DC6000 drives include the Legacy 150S, Sankyo MT-525X, and Tandberg Data Panther 525.

Since all the 8mm drive mechanisms are made by one manufacturer—Exabyte—your buying decision should be based on the drive's price and software. PCPC's JetStream drive and its Netstream software rated very well in our speed tests. Furthermore, the JetStream allows you to back up all the hard drives on a network. Another notable 8mm unit, the THS-2200 from Tecmar, includes backup software that has a superior user interface, nicely balancing ease of use with powerful file-selection features.

In general, 8mm drives are more expensive and slower than DAT units. Most 8mm units hold 2.2GB of data; some, however, can hold over twice as much data—5GB. And 8mm backup mechanisms are used regularly on hardware platforms other than the Mac, such as Sun Microsystems' workstations and Digital Equipment Corporation's VAX minicomputers. There are conversion utilities that allow you to transfer Sun and VAX data to the Macintosh via 8mm backup tapes, a handy feature for mixed computing environments.

Tapes for the helical drives cost very little—especially when you figure them in dollars per megabyte. Data-quality DAT tapes have a street price of under $20 each, while the 8mm tapes cost about $15.

Backup Software

Just as important as the tape mechanism is the software that drives it. Software that is hard to set up and use makes backing up a trial; software that is easy to set up and use makes it a snap. Today's software allows you to select specific files or folders for backup, back up only files

that have changed since the previous backup, and back up across multiple tapes should you have more data than can fit onto one tape. All but Apple's Tape Backup 40SC let you back up and restore files over a network and save a default backup script that you can reuse. The better software lets you verify a backup—that is, ensure that the data on the tape is an exact copy of the data on the hard drive—and lets you set the backup for a specific time.

A majority of manufacturers bundle Dantz Development Corporation's Retrospect with their drives, and it's not hard to see why. Retrospect works with virtually every kind of tape drive available. Its file-selection features are excellent. For example, you can choose to back up only documents that have been modified since last Tuesday, or, on color machines, just Word files with red icons. You can even use the selection criteria for backing up files on a remote volume (say, a file server). Retrospect also has the best scheduling features, providing a calendar that lets you click on specific dates or days of the week for automatic backups.

Other manufacturers have written their own software. Tecmar and PCPC in particular have created very good packages. Tecmar's QT Backup—which comes bundled only with Tecmar's drives—is especially good, having two distinct modes. It has an icon-driven, easy-to-use interface, perfect for the novice operator. For the power user, Tecmar provides another layer, with excellent file-selection capabilities and timed automatic backups.

MORE DATA LESS SPACE

When talking about today's backup needs, the words *enough* and *storage* have only a nodding acquaintance. Consider, for example, that a single Adobe Photoshop document can eat up a dozen megabytes of disk space. To deal with the need to squeeze ever more data onto tape, tape-drive manufacturers are turning to data compression.

What is data compression, anyway? It's a technique that takes advantage of the redundancies in files to turn information into codes and create files that are smaller than the original file. Let's say you want to compress a report. The compressing hardware or software scans the text and assigns codes to oft-repeated words. These codes use fewer characters than the original word does. Using this method, a word like *the* could be represented by the number 1—a savings of 66 percent. The compressor continues through the document, assigning codes and creating the compressed document, which includes a decoding table so that the document can be reconstituted. This is a greatly simplified explanation of a technique called Huffman coding. Another commonly used kind of compression is the Lempel-Ziv method, which usually works more efficiently than the Huffman method.

For years telecommunications users have been compressing files with programs such as Aladdin System's StuffIt and Salient Software's DiskDoubler when uploading and downloading files from bulletin boards and online services. Backup programs also use compression. At the cost of slower backup times, Dantz's Retrospect uses a Lempel-Ziv algorithm to fit more data on any given storage medium. And Fifth Generation Systems' Fastback II uses a compression scheme to fit more data onto floppy disks.

Now tape-drive vendors are adding compression algorithms to hardware in order to increase data capacities. WangDAT already uses a proprietary compression chip in its 2600 DAT drive. Unfortunately, this means that backup tapes made on a WangDAT 2600 using compression can only be read by another WangDAT 2600 unit. With compression a WangDAT 2600 drive can hold 2.6GB of data, versus the 1.3GB capacity of a WangDAT 1300 drive, which doesn't include a compression chip.

Tandberg plans to add compression to its 525MB DC6000 drive by the end of the year. By the time you read this, Archive will have incorporated hardware compression into its Python series of DAT drives, using the STAC compression chip developed by Hewlett-Packard. The compression scheme implemented with this chip is based on a standard that's been agreed upon by most of the major DAT developers and should allow the Python drives to hold up to 4GB of data. WangDAT also plans to offer STAC-chip compression in future products.

On the 8mm side, Exabyte has publicly discussed adding data compression in hardware to its drives, boosting its capacity to 10GB or higher. Although no actual product has yet been announced, I expect to see a 10GB tape drive shipping by early 1992.

Squeezing more data onto a tape is a real help, but remember that all files are not equally compressible. Text and database files are usually the best candidates for compression, and for such files reductions of 50 percent or more are common. Font and sound files, however, have a compression scheme built into them, and they rarely shrink more when compressed by other methods. In fact, trying to compress an already-compressed file can cause the file to grow a bit, since the overhead of the compression scheme is added to the existing file. So when it comes to real-world compression, your mileage may vary.

MW LAB Tape Drive Speed Tests

All times in seconds

Color Key

- Fastest product in the test
- **Percent slower than fastest**
- Up to 10%
- 11%–20%
- 21%–30%
- 31% or more

The drives are listed from best overall performance (top) to worst overall performance (bottom), based on real-life Backup and Restore tests. To determine the ranking, we first indexed the drives' performance figures within each test. The fastest drive in each test received a 1.00 index ranking. We then averaged the indexes from the individual tests to come up with an overall ranking for the drives. Index numbers are listed next to the product name.

Some drives use software that does not verify the accuracy of backed up data. These drives could not, therefore, perform the two Backup-with-verification tests. These drives are denoted by an NA in the place of test figures.

Teac, DC2000, DC6000

		Back up one 15MB file (without verification)	Back up one 15MB file (with verification)	Restore one 15MB file	Back up 30MB of files (without verification)	Back up 30MB of files (with verification)	Restore 30MB of files	Seek and restore one 3.2MB file
1.00	Legacy Storage Systems Legacy 500s (DC6000)	105.6	271.0	94.6	217.8	543.1	286.6	26.3
0.98	Sankyo MT-1000-RF (DC6000)	109.5	278.6	96.1	206.5	470.8	268.7	31.2
0.96	MicroNet Technology MT-320 (DC6000)	120.4	307.8	94.3	222.4	499.4	266.6	29.7
0.96	Optima Technology DisKovery 525T (DC6000)	121.6	308.8	95.2	223.3	505.4	266.2	30.2
0.88	Tandberg Data Panther 250 (DC6000)	115.0	303.7	96.1	288.8	637.6	330.0	30.1
0.80	Tallgrass Technologies FileSecure 1000 (DC6000)	101.7	284.5	93.8	351.3	738.2	385.6	44.8
0.64	MacProducts USA MagicTape 150 (Teac)	152.8	337.2	166.1	300.9	680.5	389.9	52.8
0.64	APS Teac 155 (Teac)	153.4	339.4	167.3	303.6	679.9	388.8	52.3
0.64	Legacy Storage Systems Legacy 150S (DC6000)	174.3	459.1	163.0	337.0	679.9	393.7	42.4
0.63	Sankyo MT-500-RF (DC6000)	176.6	354.3	165.9	343.9	699.2	396.8	42.5
0.61	Optima Technology MiniPak 150T (TEAC)	164.5	352.7	170.4	338.0	748.0	417.0	48.2
0.60	Procom Technology PMT150/M (Teac)	165.0	350.8	176.5	332.2	729.3	414.7	55.1
0.59	EMac Impact 150T (Teac)	165.4	351.1	177.6	337.0	757.6	420.9	56.5
0.58	Tecmar QT-Mac80 (DC2000)	184.0	377.9	190.8	385.2	788.4	428.7	45.2
0.57	APS Teac 600 (Teac)	197.7	471.6	194.7	309.4	780.9	411.5	57.6
0.57	CMS Enhancements TS150 (Teac)	162.7	NA	159.9	314.0	NA	383.3	131.1
0.56	Hard Drives Int'l PowerDrive 150 Tape (Teac)	156.9	342.9	164.8	347.3	713.4	371.9	144.9
0.55	Ruby Systems StarDrive 150TX (Teac)	158.6	345.3	166.6	356.1	720.6	379.1	147.5
0.53	Procom Technology PMT60/M (Teac)	203.9	424.8	202.3	403.6	852.9	473.9	51.7
0.52	Peripheral Vision Storage PV-250T (DC6000)	179.0	464.4	166.7	414.5	897.0	489.7	75.4
0.51	Microtech International T150 (Teac)	172.9	359.1	164.1	359.7	717.3	414.5	289.5
0.48	Optima Technology DisKovery 250T (DC6000)	218.5	553.8	216.8	423.5	851.5	483.5	69.9
0.45	Relax Technology 160 Tape Sierra (Teac)	196.3	NA	208.4	424.7	NA	463.4	197.7
0.43	CMS Enhancements TS60 (Teac)	212.1	NA	210.8	451.6	NA	475.1	188.6
0.38	Relax Technology 250 Tape Vista (DC6000)	317.9	NA	299.5	421.5	NA	415.1	281.6
0.27	Fifth Generation Systems Fastback Tape (DC2000)	290.6	1621.8	507.3	577.8	3384.0	718.8	710.8
0.10	Apple Computer Tape Backup 40SC (DC2000)	1022.0	NA	980.2	3670.8	NA	2888.5	182.3

DAT, 8mm

		Back up one 15MB file (without verification)	Back up one 15MB file (with verification)	Restore one 15MB file	Back up 30MB of files (without verification)	Back up 30MB of files (with verification)	Restore 30MB of files	Seek and restore one 3.2MB file	Back up 180MB server	Restore 180MB server
1.00	APS WangDAT 2600 (DAT)	102.3	237.8	92.7	197.9	445.5	277.3	37.1	837.1	2448.0
0.99	MicroNet Technology MD-5000 (DAT)	104.6	235.0	96.5	197.8	444.8	275.2	36.4	844.3	2462.0
0.99	FWB hammerDAT5000 (DAT)	104.4	236.5	95.2	206.7	447.9	272.8	36.8	833.2	2448.0
0.94	APS Archive Python (DAT)	97.3	220.9	107.7	213.5	461.9	282.0	35.6	1077.9	2649.0
0.93	Peripheral Vision Storage PV-DAT (DAT)	109.8	230.2	105.7	213.8	457.9	281.1	33.9	1083.0	2621.0
0.93	MicroNet Technology CPKD-2000 (DAT)	109.7	230.5	107.4	210.6	456.9	280.0	34.4	1085.7	2603.0
0.92	MacTel Technology Index DAT (DAT)	109.8	233.8	106.6	212.2	461.4	281.6	36.1	1088.6	2640.0
0.91	Irwin Magnetic Systems Model 9101E (DAT)	109.8	235.4	111.4	213.2	466.3	282.4	35.9	1091.7	2642.0
0.91	Third Wave Computing DATadrive 2.0 (DAT)	110.3	234.4	107.8	211.0	458.9	281.1	37.8	1087.0	2644.0
0.88	Relax Technology 1.2 Gig Tape Sierra (DAT)	185.0	NA	99.1	322.0	NA	257.1	33.6	1364.9	1226.8
0.87	Tecmar THS-2200 (8mm)	244.7	333.8	78.7	386.8	597.1	212.8	59.2	1277.1	998.3
0.86	EMac Metro DAT (DAT)	121.5	267.9	116.3	221.4	512.4	303.9	38.3	1168.5	2697.0
0.86	PCPC JetStream (8mm)	265.2	NA	87.2	355.2	NA	205.7	88.6	1022.8	944.5
0.84	Procom Technology MDAT1300/M (DAT)	127.1	276.6	116.4	222.7	512.5	302.2	40.5	1170.0	2710.0
0.82	Hard Drives Int'l PowerDrive 1.3 GB DAT (DAT)	97.3	222.4	107.9	287.4	640.1	360.1	52.7	1085.9	2643.0
0.80	Tecmar DATaVault (DAT)	213.8	339.2	92.7	341.3	616.7	430.5	37.0	1243.7	1309.2
0.80	Microtech International T1200 (DAT)	118.2	235.8	96.6	230.6	448.6	314.3	193.1	1142.2	1606.5
0.80	CMS Enhancements PDT1300 (DAT)	126.7	NA	119.3	247.0	NA	301.5	91.1	1117.3	1535.8
0.76	Legacy Storage Systems Legacy 2000s (8mm)	167.7	294.4	108.2	297.8	560.0	278.8	51.8	1164.6	2468.0
0.76	Tallgrass Technologies FileSecure 1300 (DAT)	150.6	292.3	121.6	251.9	523.9	297.1	51.9	1294.9	2667.0
0.76	PLI 2.0Gig DAT Drive (DAT)	148.6	292.6	120.2	245.8	510.8	304.5	54.9	1267.5	2681.0
0.75	MacProducts USA MagicTape 1.3 GB (DAT)	150.8	293.2	121.2	239.1	510.9	305.6	56.7	1307.6	2698.0
0.73	FWB hammerDAT2000 (DAT)	119.3	270.0	116.2	304.3	674.4	405.4	63.5	1148.8	2707.0
0.69	ADIC MacBack DAT (DAT)	172.0	354.9	154.4	333.3	676.1	371.9	55.7	1357.7	1673.0
0.66	FWB hammerTape5000 (8mm)	252.6	426.9	119.2	387.5	722.2	297.7	56.1	1313.8	2424.0
0.65	Relax Technology 2.2 Gig Tape Vista (8mm)	205.8	NA	131.8	366.7	NA	357.6	113.4	1317.4	1369.3

An example of backup software that I disliked is SoftBackup, bundled with drives from Relax. SoftBackup is fairly easy to learn, but it is marred by a fatal flaw: it won't back up any open files. Because the System, Finder, and Desktop files are always open when MultiFinder is running, any backup made under MultiFinder won't contain these files—and these are just the files you need most for a proper restore in the event of a hard drive crash. This flaw just isn't acceptable, especially since System 7 runs MultiFinder all the time.

Network Backup

A large number of Macs are connected to a LocalTalk or Ethernet network, and many network managers want to centralize the backup process for all the hard drives on the network. By backing up all drives on a network to one device, a network administrator can be assured of consistent, reliable backups for all the network's users. All network-backup software allows you to delay backup until after the close of the business day, so users aren't disturbed by the backup process (this is especially important for network backup

TAPE DRIVES COMPARED

Company	Product	Lab Tested	Hardware Manufacturer	Software Manufacturer	Price	Capacity	SCSI Termination	AppleShare Privileges	A/UX-Compatible
TEAC DRIVES									
APS	APS Teac 155	●	Teac	Dantz	$599	150MB	External	●	○
APS	APS Teac 600	●	Teac	Dantz	$899	600MB	External	●	○
CMS Enhancements	TS60	○	Teac	CMS	$1099	60MB	Internal	●	○
CMS Enhancements	TS150	●	Teac	CMS	$1399	150MB	Internal	●	○
EMac	EMac Impact 150T	●	Teac	Dantz	$989	150MB	External	●	○
Hard Drives International	Power Drive 150 Tape	●	Teac	Nuvo Labs	$549	150MB	External	●	○
MacProducts USA	MagicTape 60	○	Teac	Dantz	$679	60MB	External	●	○
MacProducts USA	MagicTape 150	●	Teac	Dantz	$699	150MB	External	●	○
MicroNet Technology	CPKT-155	○	Teac	Dantz [1]	$995	150MB	External	●	○
MicroNet Technology	CPKT-600	○	Teac	Dantz [1]	$1495	600MB	External	●	○
MicroNet Technology	MT-155	○	Teac	Dantz [1]	$1095	150MB	External	●	○
Microtech International	Microtech T150	●	Teac	Centa Systems	$1099	150MB	External	○	○
Optima Technology	MiniPak 150T	●	Teac	Dantz	$895	150MB	External	●	○
Procom Technology	PMT60/M	●	Teac	Dantz	$855	60MB	External	●	○
Procom Technology	PMT150/M	●	Teac	Dantz	$995	150MB	External	●	○
Relax Technology	160 Tape Sierra	●	Teac	Dantz	$499	150MB	External	●	○
Relax Technology	60 Tape Vista	○	Teac	Dantz	$429	60MB	External	●	○
Ruby Systems	StarDrive 150TX	●	Teac	Nuvo Labs	$899	150MB	Internal	○	○
Third Wave Computing	Third Wave 150T	○	Teac	Dantz	$595	150MB	Internal	●	○
Third Wave Computing	Third Wave 600T	○	Teac	Dantz	$895	600MB	Internal	●	○
DC2000 DRIVES									
Fifth Generation Systems	Fastback Tape	●	3M	Fifth Generation	$1395	128MB	External	●	●
Irwin Magnetic Systems	Irwin Model 5080	○	Irwin Magnetic	Irwin Magnetic	$1095	120MB	External	●	●
Tecmar	QT-Mac40	○	Braemar	Tecmar	$1395	60MB	External	●	●
Tecmar	QT-Mac80	●	3M	Tecmar	$1795	120MB	External	●	●
DC6000 DRIVES									
Blackhole Technology	MacTape/SCSI-7	○	Tandberg Data	Dantz	$1695	525MB	Internal	●	○
FWB [2]	hammerTape250	○	Archive	FWB/Dantz	$1799	250MB	External	●/●	●/○
Legacy Storage Systems	Legacy 150s	●	Wangtek	Dantz [3]	$1499	150/250MB	External	●	○
Legacy Storage Systems	Legacy 500s	●	Wangtek	Dantz [3]	$2199	525MB	External	●	○
MicroNet Technology	MT-150	○	Tandberg Data	Dantz [1]	$1495	150MB	External	●	○
MicroNet Technology	MT-320	○	Tandberg Data	Dantz [1]	$1645	320MB	External	●	○
Optima Technology	DisKovery 250T	●	Tandberg Data	Dantz	$995	250MB	External	●	○
Optima Technology	DisKovery 525T	●	Tandberg Data	Dantz	$1495	525MB	External	●	○
Peripheral Vision Storage	PV-250T	●	Archive	Dantz	$695	250MB	External	●	○
Relax Technology	250 Tape Vista	●	Archive	Diversified I/O	$599	250MB	External	●	○
Sankyo	MT-500-RF	●	Sankyo	Dantz	$1406	250MB	External	●	○
Sankyo	MT-1000-RF	●	Sankyo	Dantz	$1532	525MB	External	●	○
Tallgrass Technologies	FileSecure 500	○	Cipher	Dantz	$1795	250MB	External	●	○
Tallgrass Technologies	FileSecure 1000	●	Wangtek	Dantz	$2695	525MB	External	●	○

● = yes; ○ = no. [1] Shipped with Retrospect Remote 4 packs. [2] Shipped with FWB backup software and Retrospect Remote 4 packs; features for both listed. [3] Shipped with Retrospect Remote 10 pac

because sending megabytes of data over network cabling is a slow process). Macworld Lab tested four network-backup programs: QT Backup Network from Tecmar, Netstream Backup from PCPC, MacBack from ADIC, and Retrospect Remote from Dantz Development. Of these, QT Backup Network and MacBack are only available bundled with the respective manufacturers' tape drives.

All these programs require you to install application software on the Mac to which the tape drive is connected. You must also install software (usually one or more INITs) on the remote Macs (or *clients*) that will be backed up. The network administrator uses the application software on the central Mac to schedule the time for the backup to occur.

MultiFinder Background	Timed Backup	Prints Tape Directory	Warranty (in years)
●	●	●	1
●	●	●	1
●	●	○	1
●	●	○	1
●	●	●	2
●	●	●	1
●	●	●	2
●	●	●	2
●	●	●	1
●	●	●	2
●	●	●	1
●	●	●	1
●	●	●	1
○	○	○	2
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
○	○	○	1
●	●	●	1
●	●	●	1
●	●	●	1
○	●	●	1
●	●	●	2
●	●	●	2
●	●	●	1
●/●	●/●	●/●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	2
●	●	●	2
●	●	●	2
●	●	●	2

Tecmar's QT Backup Network is the easiest of the network-backup programs to set up and use. The client controls whether or not the network administrator has access to the remote Mac, and can even password-protect the client Mac. The administrator defines the backup script for each client from the central Mac. Scripts are easy to write—you simply click on the files and folders you want to back up. I found QT Backup to be the most intuitive of the network-backup programs; I didn't even need to crack the manual before I completed my first network backup. Unattended automatic backup is just as easy to schedule.

Netstream Backup, bundled with PCPC's 8mm JetStream tape drive, is fairly straightforward to set up and use, but the interface is not especially intuitive. Plan to spend some time with the manuals in order to get the most out of this package. The client, not the administrator, has control over what files get copied, by creating a Remote Backup Set and submitting it to the administrator for backup. But the administrator gets to decide when the backups occur and which Remote Backup Sets get executed. Netstream Backup was the first network-backup program, and it is still a good performer.

ADIC's MacBack software (bundled with the ADIC drives) needs a bit more work. I found it difficult to set up and use. The network administrator must perform a lot of work in the server application to get the backup process running. The administrator must set the server name, make a list of authorized users, determine if each user can have full access to everything on the tape, schedule backups for everyone, and determine what files are to be backed up (the client has only limited control over what does or doesn't get backed up). The administrator must then install both an INIT and an application on each client Mac, start up each client application, and log on to the server in order to do an unattended backup. This lengthy procedure makes backing up unnecessarily difficult—and the harder it is to do a backup, the less likely it is that a backup will be done.

Because of its profusion of features, Retrospect Remote is the cream of the network-backup crop. Clients specify which folders on their hard drives are accessible by the tape drive, and clients can prevent backup of their machine from taking place. Once the client has granted the administrator access (you can set a password for extra security), the administrator has complete control over which of the specified files

and folders to back up. The administrator can save these choices in a script for each client and set up master scripts to execute many individual backup scripts in succession.

Dantz's Retrospect Remote can be a bit tricky to set up, however. Backups that are set to occur at a specified time are best done by using a script that outlines what files and what drives are to be backed up. The administrator has to be careful that the tape name and the backup name are the same for all the client scripts, or the automatic backup will halt. It would be helpful to have a feature that would check all the client scripts for proper execution when you define a master script.

Retrospect Remote has some nice features that put it above the other network-backup programs. If a client chooses Shut Down, Retrospect Remote intercepts the shutdown if a backup is scheduled and informs the user that the shutdown has been delayed until the backup is done. A screen saver then starts up. After the backup is complete, the client machine goes through with the shutdown.

TAPE DRIVES COMPARED (continued)

Company	Product	Lab Tested	Hardware Manufacturer	Software Manufacturer	Price	Capacity	SCSI Termination	AppleShare Privileges	A/UX-Compatible
Tandberg Data	Panther 250	●	Tandberg Data	Dantz [1]	$2145	250MB	Internal	●	○
Tandberg Data	Panther 525		Tandberg Data	Dantz [1]	$2695	525MB	Internal	●	○
Tecmar	QT-Mac150		Wangtek	Tecmar	$2395	150MB	External	●	●
Tecmar	QT-525es	●	Wangtek	Tecmar	$3090	525MB	External	●	●
DAT DRIVES									
ADIC	MacBack DAT	●	Hewlett-Packard	ADIC	$4995	1.3GB	External	●	○
APS	APS Archive Python	●	Archive	Dantz	$1499	1.3GB	External	●	○
APS	WangDAT 1300	○	WangDAT	Dantz	$1999	1.3GB	External	●	○
APS	WangDAT 2600	●	WangDAT	Dantz	$1999	2.6GB	External	●	○
Blackhole Technology	MacTape/SCSI-9	○	WangDAT	Dantz	$2495	1.3GB	Internal	●	○
CMS Enhancements	PDT1300	●	WangDAT	CMS	$3399	1.3GB	Internal	●	○
EMac	Metro DAT	●	WangDAT	Dantz	$2995	1.3GB	External	●	○
FWB [2]	hammerDAT2000	●	WangDAT	FWB/Dantz	$3499	1.3GB	External	●/●	●/○
FWB [2]	hammerDAT5000	●	WangDAT	FWB/Dantz	$4249	2.6GB	External	●/●	●/○
Hard Drives International	Power Drive 1.3GB DAT	●	Archive	Dantz	$1495	1.3GB	External	●	○
Irwin Magnetic Systems	Irwin Model 9101E	●	Archive	Dantz	$3696	1.3GB	External	●	○
Legacy Storage Systems	Legacy 1000s	○	Wangtek	Dantz [3]	$3699	1.3GB	External	●	○
MacProducts USA	MagicTape 1.3 GB	●	Wangtek	Dantz	$1499	1.3GB	External	●	○
MacProducts USA	MagicTape 2.0 GB	○	Wangtek	Dantz	$1799	2GB	External	●	○
MacTel Technology	Index DAT	●	Archive	Dantz	$1799	2GB	Internal	○	○
MicroNet Technology	CPKD-2000	●	Archive	Dantz [1]	$2895	2.0GB	External	●	○
MicroNet Technology	MD-1300	○	WangDAT	Dantz [1]	$2995	1.3GB	External	●	○
MicroNet Technology	MD-5000	●	WangDAT	Dantz [1]	$3195	5GB	External	●	○
Microtech International	Microtech T1200	●	WangDAT	Centa Systems	$2799	1.3GB	External	●	●
Mirror Technologies	Mirror T1200	○	WangDAT	D-K Research	$2997	1.2GB	External	●	○
PCPC	DATstream	○	Archive	PCPC	$2695	2GB	Internal	●	●
Peripheral Vision Storage	PV-DAT	●	Archive	Dantz	$1695	1.3GB	External		
PLI	PLI 2.0Gig DAT Drive	●	Wangtek	Dantz	$2795	2GB	Switchable	●	○
Procom Technology	MDAT1300/M	●	WangDAT	Dantz	$2695	1.3GB	External	●	○
Relax Technology	1.2 Gig Tape Sierra	●	WangDAT	Diversified I/O	$1399	1.2GB	External	●	○
Tallgrass Technologies	FileSecure 1300	●	Wangtek	Dantz	$4595	1.3GB	External	●	○
Tecmar	DATaVault	●	Wangtek	Tecmar	$4995	2.3GB	External	●	●
Third Wave Computing	Third Wave DATadrive 2.0	○	Wangtek	Dantz	$1495	2.0GB	Internal	●	○
8MM DRIVES									
Blackhole Technology	MacTape/SCSI-8	○	Exabyte	Dantz	$3995	2.2GB	Internal	●	○
FWB [2]	hammerTape5000	●	Exabyte	FWB/Dantz	$8999	5GB	External	●/●	●/○
Legacy Storage Systems	Legacy 2000s	●	Exabyte	Dantz [3]	$4999	2.3GB	External	●	○
MacProducts USA	MagicTape 2.3 GB	○	Exabyte	Dantz	$2795	2.3GB	External	●	○
MacProducts USA	MagicTape 5.0 GB	○	Exabyte	Dantz	$3999	5GB	External	●	○
PCPC	JetStream	●	Exabyte	PCPC	$4295	2.3GB	Internal	●	●
Relax Technology	2.2 Gig Tape Vista	●	Exabyte	Dantz	$2299	2.2GB	External	●	○
Tecmar	THS-2200	●	Exabyte	Tecmar	$6995	2.2GB	External	●	●

● = yes; ○ = no. [1] *Shipped with Retrospect Remote 4 packs.* [2] *Shipped with FWB backup software and Retrospect Remote 4 packs; features for both listed.* [3] *Shipped with Retrospect Remote 10 pa*

MW EDITORS' CHOICE

Tape drives have moved out of the realm of specialty peripherals and are now solidly in the commodity market. The technology is reliable, and tapes are being designed to hold ever more data. The software that runs the drives is, in general, well-designed and feature-packed. Your best purchasing guides within any tape format are price, service, and warranty. But which format should you get? It depends on how much data you need to back up. Because you probably want to do automatic, unattended backups, you should be sure to get a tape drive with a capacity at least a little larger than the total capacity of the hard drives you'll be backing up. With all that in mind, here are my recommendations.

MultiFinder Background	Timed Backup	Prints Tape Directory	Warranty (in years)
●	●	●	1
●	●	●	1
●	●	●	2
●	●	●	2
○	●	○	1
●	●	●	2
●	●	●	1
●	●	●	1
●	●	●	1
●	●	○	1
●	●	●	2
●/●	●/●	●/●	1
●/●	●/●	●/●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	2
●	●	●	2
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
○	●	●	1
●	●	●	2
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	1
●	●	●	2
●	●	●	2
●	●	●	1
●	●	●	1
●/●	●/●	●/●	1
●	●	●	1
●	●	●	2
●	●	●	2
●	●	●	1
●	●	●	1
●	●	●	2

If you have a 40MB hard drive, don't even bother with a tape drive; back up onto floppy disks. Backing up to floppy disks is easy, and disks are lots cheaper than tape. Or consider getting a removable-cartridge drive, such as one of the many drives based on the 45MB SyQuest mechanism (for more on removable cartridges, see "Expansion Made Easy," *Macworld,* May 1991). With a cartridge drive, you get backup space with the added attraction of expandable online storage.

For people who have 80MB to 140MB hard drives, the Teac 150MB is the backup drive of choice; I like the units from APS, EMac, MicroNet, and Procom. The 160MB to 425MB hard drive crowd can be served well on the low end of the range by a 250MB DC6000 drive, such as one from FWB, Optima, or Tandberg Data. Higher-capacity hard drives and medium-size networks are best matched with a 525MB DC6000 drive from Sankyo, Tandberg Data, and Tecmar, or with the Teac 600MB unit from APS or MicroNet. For the custodians of 600MB or larger hard drives, and for network administrators looking for a networkwide backup solution, pick a DAT drive, such as the low-cost, 1.3GB Archive Python unit from APS or Third Wave Computing, or the 2.6GB drive from FWB, MicroNet, or Third Wave. A worthwhile, although more expensive, alternative to DAT for network backup and large capacity is an 8mm drive from PCPC, Relax, or Tecmar.

ROBIN GINSBERG

Better buys in Teac drives include (from top to bottom) the Optima Minipac 150T, MicroNet CPKT-600, EMac Impact Tape, and Procom PMT-150.

Regardless of which tape drive you buy, you'll be able to rest easier knowing that your data is being backed up on a regular basis. ■

See *Where to Buy* for contact information.

***Tom Negrino** is a* Macworld *contributing editor and a director of the Los Angeles Macintosh Group. His SE/30 backs itself up to tape in the wee hours, to the accompaniment of his snores.*

MRC
M−
M+
ON/C

STRAIGHTFORWARD ACCOUNTING

by Stephen L. Nelson

An overview of Macintosh-based accounting software that makes it all plain and simple

If there's one thing that distinguishes accounting software from other applications, it's this: most people never successfully use these products as business tools. It's a tragedy of sorts. Many products are quite good. And it's not exaggeration to say that what you can get for a few hundred bucks today cost a hundred grand about a decade ago.

So what's the problem? In many cases people buy a good product that is all wrong for their particular needs. Another problem is that accounting software can be difficult to use. It takes at least several hours—and sometimes several days—to set up items such as preferences, charts of accounts, and vendors in an accounting system. Then once the software is installed, you must tap a skill that's usually learned in a college course.

You can use a checkbook program such as Intuit's Quicken, Survivor Software's MacMoney, Aatrix Software's CheckWriter II, DacEasy's Light Checkbook Accounting, or MECA Software's Andrew Tobias' Managing Your Money for keeping track of how much money you spend and where you spend it. These programs are easy to use and require no knowledge of bookkeeping. But they don't equal the true accounting packages in their features: their forms-generation and record-keeping abilities are limited; they can't calculate payroll taxes and deductions; and they don't offer specific functions such as accounts receivable, accounts payable, or job costing. This article focuses on helping you choose a product suitable for true accounting.

Narrowing the Choices

To help you narrow your choices right away, I'll divide the products into two groups—integrated and modular. Integrated programs contain all their features in one tightly knit package. You pay a single price and get some combination of general ledger, accounts receivable, accounts payable, inventory, and payroll functions. With modular programs, you purchase each function as a separate program—paying, say, $300 or so for the general ledger and another $300 or so for accounts receivable or accounts payable.

As you might expect, modular programs offer more features than integrated programs do, and they have the distinct advantage of letting you buy only the functions you need. But for many users, the integrated programs offer sufficient features. Be sure to check the feature sets of the integrated packages before jumping into modular programs—if the features are sufficient you'll save money (as well as hard drive space).

You can further narrow your choices by deciding whether you need a single-user or multiuser package. Functionally, multiuser systems resemble single-user systems, with the added capability of allowing several people to work simultaneously on the same record or file. You may see little or no difference between single-user and multiuser systems' forms-generation, asset and liability record-keeping, and financial-management capabilities. In fact, some products, such as Logisoft's M.D.A. and CheckMark Software's MultiLedger, can be updated to multiuser status by purchasing a multiuser upgrade.

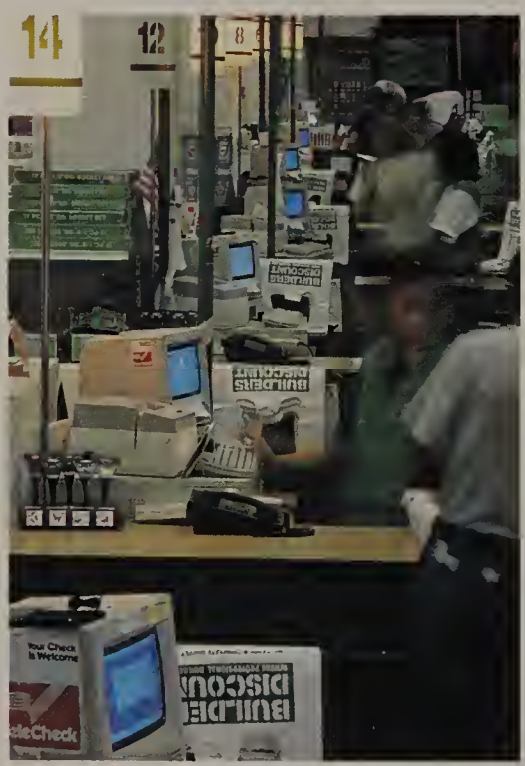
MARK JOHANN

Single-user systems, of course, can be used by several people. A company may have different people entering data, producing forms, and generating reports, using all the same program. Some single-user systems, such as Softsync/Bloc's Accountant, Inc.; Peachtree Software's atOnce and Insight Expert Accounting Series, and Computer Associates' ACCPAC Simply Accounting for the Macintosh, enable you to set up multiple passwords and specify what each password-holder can do. For example, the controller might be the only one with the password that allows access to confidential data like people's salaries.

Multiuser programs are designed for businesses with accounting departments or for businesses where many people simultaneously need to collect, or at least tap into, the accounting data. True multiuser programs such as Flexware, Great Plains Accounting, and SBT Mac Series Six Plus let more than one person work at once; they coordinate workers' use of and changes to the accounting data via file- and record-locking. For instance, if one person is updating an accounts payable record, other users may be blocked from accessing the record until the first user has finished updating the information.

Theoretically, a multiuser program can handle as many users as the network allows. But since networks tend to slow as more users are added, most multiuser accounting systems can't realistically support all that many users (or at least all that many happy users). Flexware II addresses the performance problem with network operating software (a separate module called FlexShare) that moves accounting data around the network more efficiently. At press time, Great Plains Software announced a similar product.

You must learn some basics about accounting and double-entry bookkeeping before starting to use any of the packages



RUSS WIDSTRAND

Builder's Discount, a chain of four building-supply stores, places a 1MB Macintosh SE/30 at each checkout stand to record purchasing information. The information is recorded in Flexware and is used to update inventory, accounts payable, and accounts receivable records at the company's headquarters. Builder's Discount services 2000 customers a day at each store using the system, over an AppleTalk network. Flexware's networking software makes the data handling quick and efficient.

Detailed Record-Keeping

Accounting programs provide detailed record-keeping of your accounts payable and accounts receivable. Some programs also offer detailed record-keeping for inventory, jobs (such as those a general contractor would have), and fixed assets (things like vehicles, real estate, and furniture). The level of detail varies widely, however. At one end of the spectrum, packages like Small Business Accounting System from Heizer Software, and Aware Corporate General Ledger Software from Database International provide almost no detailed record-keeping. These packages are suitable for very small businesses where simplicity is key.

In the middle ground, you find packages like atOnce, which track cash, accounts payable, and accounts receivable; and ACCPAC and Assistant Controller Accounting Series, which track accounts payable, accounts receivable, inventory, and job costing. On the high end, packages like Accountant, Inc.; Flexware; Great Plains Accounting; and M.Y.O.B. provide everything the others do plus record-keeping features for purchase orders and fixed assets.

There's also a great deal of variability in the amount of information that the different packages calculate and store. Less information isn't necessarily bad, and more information isn't necessarily good. You don't want to store a massive amount of information that serves no purpose, since more data requires more data entry, slows down the package's speed, and uses more storage space. Most of the packages provide between two and three dozen fields for storing information about a particular asset or liability, such as an account receivable or an inventory item. Several packages, including Business Sense, ProfitAbility Professional, In-House Accountant, and MultiLedger, each provide only about a dozen fields, however. With other packages, you end up building huge databases because of all the information you collect. Flexware, Great Plains, and Insight Expert Accounting Series, for example, can collect roughly five dozen pieces of information about a particular asset or liability.

Most of the programs deliver significant financial-management horsepower. Many offer flexible budgeting; let you set up multiple departments, profit centers, and companies; and even calculate financial ratios for managing your business (see "The Basics of Bookkeeping Programs").

You'll also want to check "The Basics of Bookkeeping Programs" to find out which forms the programs generate. Some programs offer rather impressive forms-generation capabilities. For example, Accountant, Inc. generates accounts payable check forms; invoices; customer statements; purchase orders; and even most payroll forms, including payroll checks, 940 and 941 payroll tax data, and W-2's. What's more, when Accountant, Inc. generates a form, it does most or all of the financial work associated with preparing the form.

Most programs use standard form layouts and often print the informa-

WHAT NOT TO DO . . .

Suppose you're a masochist—someone who finds real disasters frightfully enjoyable. Well, in that case, I've got four ideas for making this whole process—the process of finding and then using a new accounting package—absolutely miserable and quite possibly doomed. Sound like your idea of fun? Then read on.

- **Buy a program based on the length of its features list.** You'll find menus littered with options you'll never use, data entry windows cluttered with fields you won't ever want to fill, and dialog boxes stuffed with option buttons you won't need. Finding and learning to use the pieces of the program that you need will be an ongoing challenge.
- **Don't bother to learn anything about bookkeeping.** If you don't know anything about bookkeeping, you'll spend hours sweating the details and still end up with inaccurate books. If you are going to invest in accounting software, invest in some training from a professional.
- **Try using your new accounting system to clean up a mess created by the old system.** This ends up being one of those catch-22 situations. To begin using a new system, you've got to first load accurate records of your financial condition. Of course, if your old system's a mess, you don't have accurate records—so what you really do is move the mess from one system to another. Once again, the best advice is to have a knowledgeable person help you set up your system.
- **Run your old and new systems side by side.** Keeping two sets of books will double your work load. You can, of course, use your free time—weekends, holidays, and evenings—for a while. When you get tired of that, though, you will want to stop using one of the systems. And because you probably will have had no time to learn the new system, that will probably be the system you will want to give up.

tion on standard preprinted forms. This one-size-fits-all approach is fine if you can use the same basic forms that every other business does. And it's probable that you *can* use the same check forms, payroll check forms, and purchase orders. If, however, you want to tailor invoices and statements to convey your company's image or provide specific invoicing information, you'll want to use a package that lets you customize forms. Accountant, atOnce, Flexware, Great Plains, M.Y.O.B., ProfitAbility Professional, Pro Plus Accounting, and Service Industry Accounting provide workable ways to customize forms. But if you really care about producing custom forms, your best bet is Components—an object-oriented package from Satori Software that is highly customizable.

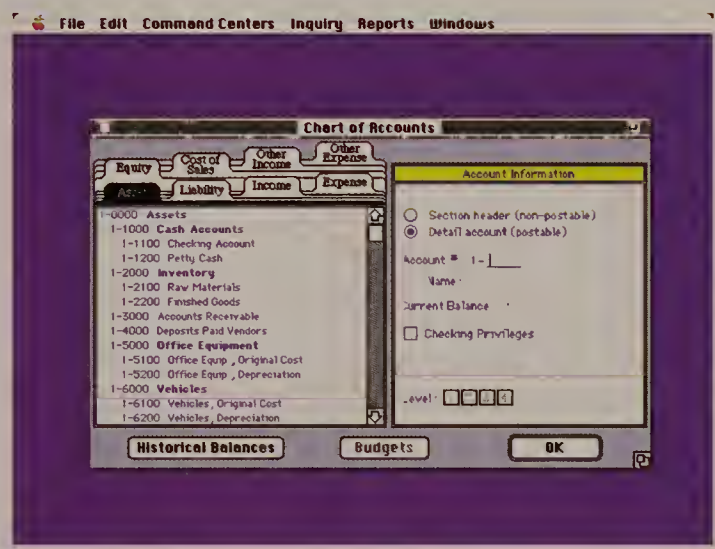
The Problem of Power

All this financial-management power requires that you learn some basics about accounting and double-entry bookkeeping before starting to use any of the packages. If you don't understand double-entry bookkeeping, you'll invariably end up charging assets and liabilities to the wrong accounts, rendering your books inaccurate. A couple of packages, notably M.Y.O.B., are based on double-entry accounting but have an interface that hides that fact from the user. In addition, M.Y.O.B. includes a checkbook segment that you can use as a stand-alone program until you're ready to step up to a full-blown double-entry bookkeeping system.

Some programs—ACCPAC, Accountant, atOnce, In-House Accountant, Great Plains, Insight Expert, M.Y.O.B., ProfitAbility Professional, SBT—include solid accounting primers in their documentation. Both atOnce and Insight Expert provide even lengthier accounting primers and much more detailed instructions on setting up an accounting system. Both programs also provide worksheets for collecting the master file data you'll need to load into the program to get started. This type of help makes atOnce and Insight Expert excellent choices for beginning accountants.

Other programs, such as Multi-Ledger, have skimpy manuals, making them a poor choice for someone lacking in Macintosh or accounting knowledge. Manapro Accounting Software offers the unusual feature of letting you switch between several languages (including English, Spanish, Portuguese, French, and German)—but the manual I was sent with the software was not written in English. Manapro offers a way to translate the manual, but this involves an extra step and some guesswork on how to perform the translation (unless you happen to read other languages fluently).

Even if the program you buy has an excellent manual, you may still need to work closely with an accountant to set up a chart of accounts correctly. You may also want to consult



A True Mac Interface Only a few programs make good use of the Macintosh interface. Teleware's M.Y.O.B. has one of the best interfaces. As just one example, M.Y.O.B. uses a file-folder metaphor to display a chart of accounts, rather than just listing the categories.

THE BASICS OF BOOKKEEPING PROGRAMS

	A4	Accountant, Inc.	ACCPAC Simply Accounting for the Macintosh	Assistant Controller Accounting Series	atOnce	Aware Corporate General Ledger	Business Sense	Champion for the Mac
Company	Softek Design	Softsynch/ Bloc	Computer Associates	Lake Avenue Software	Peachtree Software	Database International	Inman Software	Champion Business Systems
Price	$1295	$595	$199	$495 *	$249	$995	$179	$695
Modules available (modular programs only)	NA	NA	NA	NA	NA	GL, AP, AR	NA	NA
Optional modules (integrated packages only)	none	none	none	none	none	NA	T	J
Multiuser	●	○	○	●	○	●	○	○
If multiuser, maximum number of users	unlimited	NA	NA	unlimited	NA	unlimited	NA	NA
FORMS GENERATION								
Purchase orders	●	●	○	○	○	○	○	○
Accounts payable checks/1099's	●/●	●/○	●/○	●/●	●/○	○/○	●/●	●/●
Point of sale	●	○	○	○	○	○	●	●
Product invoices/service invoices	●/●	●/●	●/●	●/●	●/○	○/○	●/●	●/●
Professional invoices/customer statements	●/●	○/●	○/●	●/●	○/●	○/○	●/●	●/●
Payroll checks/W-2's	○ §/○	●/●	●/●	●/●	●/●	○/○	●	●/●
Payroll 940/payroll 941	○/○	●/●	●/●	●/●	○ ‖/○ ‖	○/○	●/●	●/●
Updatable payroll tax tables	○	●	○	●	●	○	●	●
State tax forms available	○	○	○	●	○	○	●	●
Mailing labels	●	●	●	○	●	○	●	●
ASSET AND LIABILITY RECORD-KEEPING								
Tracks purchase orders/unpaid vendor invoices	●/●	●/●	○/●	○/●	○/●	○/○	○/●	○/●
Tracks unpaid customer invoices by balance forward method/by open invoice method	○/●	●/●	○/●	●/●	●/●	○/○	●/●	●/●
Calculates accounts receivable finance charges	○	●	●	●	○	○	●	●
Tracks inventory balances (in dollars/in units)	●/●	●/●	●/●	●/●	○/○	○/○	●/○	●/●
Inventory costing assumptions								
average cost/standard cost	●/○	●/○	●/○	●/●	○/○	○/○	○/○	●/○
LIFO/FIFO	○/●	○/○	○/○	●/●	○/○	○/○	○/○	○/○
Manufacturing bill of materials function	●	○	○	○	○	○	○	○
Job cost tracking/budgeting	○/○	●/○	●/○	●/●	○/○	○/○	●/●	●/●
Tracks fixed assets/tracks cash	○/●	●/●	○/○	○/●	○/●	○/●	●/●	○/○
Schedules (depreciation/debt amortization)	○/○	○/○	○/○	○/○	○/○	○/○	●/●	○/○
Reconciles bank accounts on screen	●	●	○	○	○	●	○	○
FINANCIAL MANAGEMENT								
General ledger functions	●	●	●	●	●	●	●	●
Balance sheet	●	●	●	●	●	●	●	●
Income statement/cash flow statement	●/○	●/○	●/○	●/●	●/○	●/●	●/●	●/●
Budgeting for income and expenses	●	●	○	●	●	●	●	●
Budgeting for balance sheet accounts	●	●	○	●	○	●	●	●
Forecasts/performs consolidations	○/●	○/○	○/○	○/●	○/○	●/●	○/●	○/●
Graphs/custom report writer	○/●	○/○	○/○	○/○	○/○	○/●	●/○	○/○
Calculates financial ratios	○	●	○	○	○	○	●	●
Allows for multiple departments/companies	●/○	○/●	○/●	●/●	●/●	●/●	●/●	●/●
Exports to spreadsheets	●	●	●	●	●	●	○	○
INTERNAL CONTROL AND SUPPORT								
Allows segregation of duties via passwords	●	●	●	●	●	●	●	○
Provides detailed general ledger audit trails	●	●	●	●	●	●	●	●
Customization available	●	○	○	●	○	●	●	●
Source code/file formats available	●/○	○/○	○/○	●/○	○/○	●	○/○	●/○
800 telephone support number	○	○	○	○	●	○	○	●
Free telephone support	○	● ††	2 free calls	● **	● ††	● ††	○	○
Charge for telephone support	$25 for 15 minutes	$199 for 1 year §§	$100 per year §§	$300 for 4 hours	$1.50 per minute	○	$250 per year *	$75 per hour

● = yes; ○ = no. *GL = general ledger; AR = accounts receivable; AP = accounts payable; I = inventory; P = payroll; PO = purchase orders; SO = sales orders; J = job costing; T = time billing; IV = invoicing; G = graphing; POS = point of sale; OP = order processing.*

Components	Computerized Classic Accounting	Connected Accounting	Fiscal Knowledge	Flexware II	Great Plains Accounting	In-House Accountant	Insight Expert Accounting Series	Manapro Accounting Software	M.O.A.	M.O.A. Basics
Satori Software	Absolute Solutions	Everyware Development	Mathesis	Flexware	Great Plains Software	In-House Software	Peachtree Software	Manapro	Logisoft	Logisoft
$795 per per module †	$395 ‡	$1249	$219	$695–$895	$695–$995	$199	$395 per module	$795 per module	$1795	$1195
GL, AP, AR, J/T	NA	NA	NA	AR, AP, GL, J, I, OP, PO, POS, P	GL, AR, AP, P, I, PO, J, order entry/POS	NA	GL, AR, AP, I, P	GL, AR	NA	NA
NA	none	I, J, T	none	NA	NA	none	NA	NA	none	G
J, T only	●	●	○	●	optional	○	○	○	optional	optional
unlimited	unlimited	255	NA	99	unlimited	NA	NA	NA	300	300
○	●	●	○	●	●	○	○	●	●	○
●/●	●/○	●/●	○/○	●/●	●/●	●/○	●/●	●/●	●/●	●/●
●	○	●	○	●	●	○	○	○	●	●
●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
●/●	●/●	●/●	●/●	●/●	●/●	●/●	○/●	●/●	●/●	●/●
●/○	●/●	○/○	●/○	●/●	●/●	○/○	●/●	●/●	○/○	○/○
○/○	○/○	○/○	●/●	●/●	●/● ‖	○/○	○ ‖/○ ‖	●/●	○/○	○/○
○	○	○	●	●	●	○	●	●	○	○
○	○	○	●	●	●	○	○	●	○	○
●	●	●	●	●	●	●#	●	●	●	●
●/●	●/●	●/●	○/●	●/●	●/●	○/●	○/●	●/●	●/●	○/●
●/●	●/●	○/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
●	○	○	●	●	●	○	●	●	●	●
●/●	●/●	●/●	○/○	●/●	●/●	●/●	●/●	●/●	●/●	○/○
○/○	○/●	●/●	●/●	●/●	●/●	○/○	●/○	●/●	●/●	○/○
○/○	○/○	●/●	●/●	●/●	●/●	○/○	●/●	●/●	●/●	○/○
○	○	●	○	●	○	○	○	○	●	○
●/●	●/●	●/●	●/●	●/●	●/●	○/○	○/○	○/○	○/○	○/○
○/●	●/●	●/●	●/●	●/○	○/●	○/●	○/●	○/○	○/●	○/●
○/○	●/●	●/○	○/○	●/○	○/○	○/○	●/●	○/○	○/○	○/○
●	●	●	●	●	●	●	●	○	●	●
●	●	●	●	●	●	●	●	●	●	●
●	●	●	●	●	●	●	●	●	●	●
●/●	●/●	●/●	●/○	●/○	●/●	●/●	●/○	●/○	●/●	●/●
●	●	●	●	●	●	●	●	○	●	●
●	●	●	●	●	●	●	●	○	●	●
●/●	●/●	○/●	●/●	○/○	●/●	●/○	○/○	○/●	●/○	●/○
●/●	●/●	○/●	●/●	●/●	●/●	●/○	●/○	○/●	●/●	●/●
●	●	○	○	●	●	○	●	●	○	○
●/●	○/●	●/●	●/●	●/●	●/●	○/●	●/●	●/●	●/●	●/●
●	●	●	●	●	●	●	●	●	●	●
●	●	●	○	●	●	○	●	●	●	●
●	●	●	●	●	●	○	●	●	●	●
●	●	●	●	●	○	○	○	○	●	●
○/○	●/●	○/●	○/○	●/○	○/●	○/○	○/○	○/○	○/●	○/●
○	●	○	○	○	●	●**	●	●	○	○
○	●††	●††	●	○	○	○	●††	●‡‡	●††	●††
$1.50 per minute	$25 per call or $2 per minute	$60 per hour	NA	$995 for 6 months	$25–$95, depending on support plan	$15 per call	$1.50 per minute	○	$700 per year §§	$700 per year §§

** $695 for multicompany series. † Job costing/time billing module costs $1495. ‡ $395 package includes GL, AR, AP, I. GL only is $195. An Enhanced GL module costs $695; a package with the Enhanced GL, AR, AP, and I modules costs $995. § Links to Aatrix Payroll. ‖ The program generates information for manual creation of these reports. # Exports data to HyperCard. ** If you purchase a support plan. †† Free for first 30 days only. ‡‡ Free for first 90 days only. §§ Fee includes free or discounted product updates.*

	Minimum Requirements	MultiLedger	M.Y.O.B.	ProfitAbility Professional	ProPlus Accounting	Rags to Riches for Accounting	SBT Mac Series Six Plus
Company	Spreadware	Checkmark Software	Teleware	Wetzel & Company	Pro Plus Software	Chang Labs	SBT Corporation
Price	$59	$395	$249	$249	$995, or $350 per module	$99 per module	$695 per module
Modules available (modular programs only)	NA	NA	NA	NA	AR, AP, GL, I	GL, AR, AP, PO, SO, T, POS	GL, AR, AP, PO/I, SO/I, P
Optional modules (integrated packages only)	none	P	none	P, T	NA	NA	NA
Multiuser	○	optional	○	○	○	○	●
If multiuser, maximum number of users	NA	5	NA	NA	NA	NA	254
FORMS GENERATION							
Purchase orders	○	●	●	●	●	●	●
Accounts payable checks/1099's	●/○	●/● *	●/○	●/○	●/●	●/○	●/●
Point of sale	●	●	●	●	●	●	●
Product invoices/service invoices	●/●	●/●	●/●	●/●	●/○	●/●	●/●
Professional invoices/customer statements	●/●	●/●	●/●	●/●	○/●	●/●	●/●
Payroll checks/W-2's	○/○	●/●	○/○	●/○	○/○	●/○	●/●
Payroll 940/payroll 941	○/○	○/●	○/○	○/●	○/○	○/○	○/●
Updatable payroll tax tables	○	●	○	●	○	○	●
State tax forms available	○	○	○	○	○	○	○
Mailing labels	○	●	●	●	●	●	●
ASSET AND LIABILITY RECORD-KEEPING							
Tracks purchase orders/unpaid vendor invoices	●/●	○/●	●/●	●/●	●/●	●/●	●/●
Tracks unpaid customer invoices by balance forward method/by open invoice method	○/●	○/●	●/●	○/●	●/●	●/●	●/●
Calculates accounts receivable finance charges	○	●	●	●	●	●	●
Tracks inventory balances (in dollars/in units)	●/○	●/●	●/●	●/●	●/●	○/○	●/●
Inventory costing assumptions							
average cost/standard cost	○/○	●/○	●/●	○/○	●/●	○/○	●/○
LIFO/FIFO	○/○	○/○	○/○	○/●	●/●	○/○	○/○
Manufacturing bill of materials function	○	○	○	○	○	○	○
Job cost tracking/budgeting	●/○	●/●	●/○	●/●	○/○	●/○	○/○
Tracks fixed assets/tracks cash	●/●	○/●	●/●	●/●	○/●	○/●	○/●
Schedules (depreciation/debt amortization)	○/○	○/○	○/○	●/●	○/○	○/○	○/○
Reconciles bank accounts on screen	●	●	●	●	●	●	●
FINANCIAL MANAGEMENT							
General ledger functions	○	●	●	●	●	●	●
Balance sheet	○	●	●	●	●	●	●
Income statement/cash flow statement	●/○	●/○	●/●	●/●	●/●	●/○	●/●
Budgeting for income and expenses	○	●	●	○	●	○	●
Budgeting for balance sheet accounts	○	○	●	○	○	○	●
Forecasts/performs consolidations	○/○	○/○	●/●	●/○	○/●	○/●	●/●
Graphs/custom report writer	○/○	●/○	●/○	●/●	●/○	○/●	○/●
Calculates financial ratios	○	○	○	●	○	○	●
Allows for multiple departments/companies	●/●	●/●	○/●	●/●	●/●	●/●	●/●
Exports to spreadsheets	●	●	●	●	●	●	●
INTERNAL CONTROL AND SUPPORT							
Allows segregation of duties via passwords	○	●	○	●	●	●	●
Provides detailed general ledger audit trails	○	●	●	●	●	●	●
Customization available	●	○	●	●	○	○	○
Source code/file formats available	●/●	○/○	○/○	○/○	○/○	○/●	●/○
800 telephone support number	○	○	●	●	●	○	○
Free telephone support	●	●	●[1]	●	●	●[3]	●[1]
Charge for telephone support	NA	NA	$79 per year[5]	NA	NA	○	900 line

● = yes; ○ = no. GL = general ledger; AR = accounts receivable; AP = accounts payable; I = inventory; P = payroll; PO = purchase orders; SO = sales orders; J = job costing; T = time billing; IV = invoicing; G = graphing; POS = point of sale; OP = order processing.

* With 1099 utility program. [1] Free for first 30 days only. [3] Free for first 90 days only. [5] Fee includes free or discounted product updates.

Service Industry Accounting	Small Business Accounting System	Spreadware Accounting
Brown-Wagh Publishing	Heizer Software	Spreadware
$395	$99	$89
NA	NA	NA
none	none	none
○	○	○
NA	NA	NA
○	○	○
●/○	○/○	●/○
○	○	○
●/●	○/○	○/○
●/●	○/○	○/○
○/○	○/○	○/○
○/○	○/○	○/○
○	○	○
○	○	○
●	○	○
○/●	○/○	○/●
●/●	○/○	●/●
○	○	●
●/●	○/○	●/○
●/●	○/○	○/●
○/○	○/○	○/○
○	○	○
●/○	●/○	●/○
●/○	○/○	●/●
○/○	○/○	○/○
○	○	●
●	●	●
●	●	●
●/○	●/○	●/●
●	○	○
●	○	○
○/○	○/○	○/●
○/○	●/○	●/●
○	○	○
●/●	●/○	●/●
●	●	●
●	○	○
○	●	●
○	○	●
○/○	●/●	●/●
●	○	○
●	●	●
NA	NA	NA

an accountant to determine exactly what forms you need to generate, how detailed your records need to be, and what features you need in order to monitor your company's financial condition. Determining these things will help you finally choose the right software.

The Issue of Interface

In spite of the quality of the accounting packages for the Mac, I was disappointed by the fact that so few have really taken advantage of the Mac's interface. For example, ACCPAC, Assistant Controller, and even large portions of Great Plains don't take advantage of the pull-down menus and dialog boxes that are so common to Macintosh programs. Some of the packages—A4, Accountant, Aware, Business Sense, Components, Computerized Classic Accounting, Flexware, In-House Accountant, Insight Expert, MultiLedger, and Pro Plus Accounting—at least provide command buttons and graphical reporting of financial information.

Only a couple of programs—atOnce and M.Y.O.B.—really take advantage of the Macintosh interface. In M.Y.O.B., for example, command buttons don't just appear in a row at the top of the screen, they are arranged in a flowchart. As a result, you don't need to be an accountant to know the order in which the commands should be used. M.Y.O.B. also uses the graphical interface to better organize large amounts of data—its chart of accounts doesn't just appear in a monstrously long, scrollable list box; it is arranged in a window that looks like an open file drawer with tabbed file folders.

The Right Product

As noted earlier, there are many good accounting products. The real problem is picking the right product, one that you have the patience and skills to use. If you consider your needs carefully and then study the table that accompanies this feature, you're in a much better position than I am to determine which product is best for your business. If you find that some of your needs can't be practically met, find the packages that meet most of your high-priority needs.

I do, however, have a couple of favorite programs. For a system with only one user where payroll capabilities are not required, I would go with M.Y.O.B. It's got the best interface, and it does not require you to know double-entry bookkeeping. In addition, it provides almost as much forms-generation, record-keeping, and financial-management power as any other package. The only shortcoming of M.Y.O.B. is that it does not do payroll.

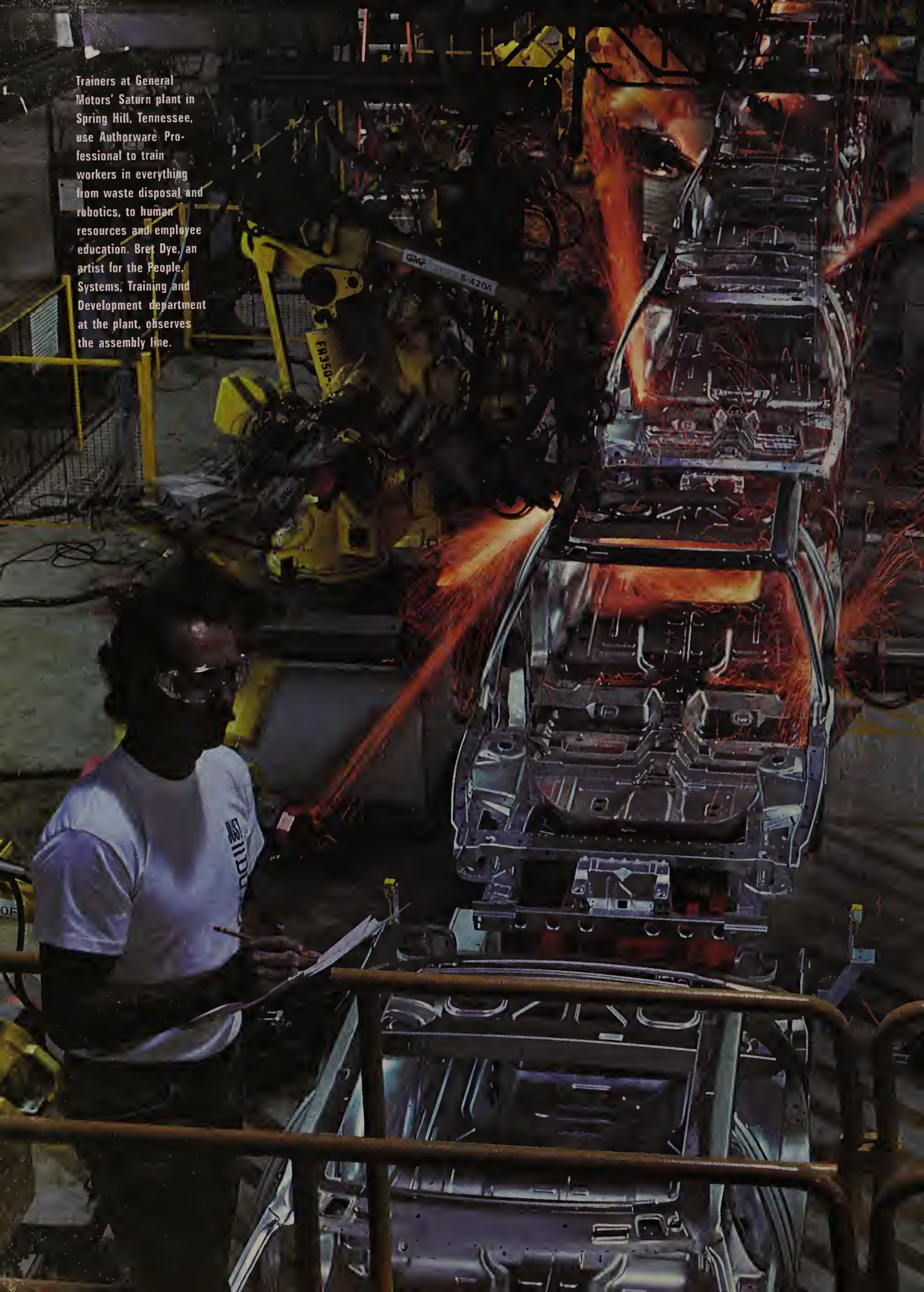
In spite of the quality of the accounting packages, only a few have really taken advantage of the Mac's interface

For a single-user system, it's a toss-up between Insight Expert and Accountant, Inc. On the one hand, Insight Expert provides the best documentation of any program I looked at, and it supports extensive record-keeping. On the other hand, Accountant is stronger overall in its various facets—forms generation, detailed record-keeping, financial-management tools, interface, and documentation. You won't go wrong with either product.

For a dedicated multiuser system, I prefer Flexware II. The program's graphical interface makes it easy to use, especially for inexperienced bookkeepers. Flexware has addressed network performance problems, letting you add more users than do similar programs (Great Plains will also offer this ability). Finally, Flexware II's documentation does a good job describing how to use the program in a business setting. ■

See *Where to Buy* for contact information.

Stephen L. Nelson, *a CPA, is the author of several books on accounting software, including* Using Quicken—Macintosh Version *(Que Corporation, 1991).*



Trainers at General Motors' Saturn plant in Spring Hill, Tennessee, use Authorware Professional to train workers in everything from waste disposal and robotics, to human resources and employee education. Bret Dye, an artist for the People, Systems, Training and Development department at the plant, observes the assembly line.

JIM STRATFORD/BLACK STAR

MULTIMEDIA DESIGN TOOLS

Picking the right tools for interactive media

MULTIMEDIA HAS RECEIVED A LOT OF PRESS IN THE PAST YEAR, and a growing range of products boast of being "hyper" this or "multi" that. But the word *multimedia* still means different things to different people, and if you use the phrase "multimedia authoring environment," expect plenty of blank faces, even among Mac enthusiasts. For the purposes of this article, multimedia authoring environment means software that allows you to integrate sound, text, graphics, and animation or video into a user-controlled product.

A sales presentation, for example, could bring together animated charts, music from a CD ROM player, and video clips of product demonstrations from a videodisc player; the user could choose which product to view and what aspect of the product to learn about. A museum display could combine animations of various geologic events with a videotape of a geologist explaining the process.

Multimedia authoring tools let you combine various media into a coherent gestalt. Each program provides different answers to the challenges of this emerging field: How complex should the authoring process be? What kinds of controls should be given to the end user? What media should be included in the presentation, and how should those media be integrated? The best authoring tool for you is the one best suited for the specific projects you want to produce.

BY NICK WEST

DAN ESCOBAR

Russ Glaser (left), David Gentry (center), and Patrick Heley (right) of HandsOn Productions of San Carlos, California, used Director to create an interactive multimedia game now on display in the Life Through Time exhibit at the California Academy of Sciences in San Francisco.

HyperCard now opens multiple stacks in variable sizes but falters in its method for adding color

Multimedia's Birth

In the beginning (August 1987) there was Apple's HyperCard—the product that introduced multimedia to a wide audience and is still the most widely used program. Included free with every Mac system, HyperCard prompted certain standards in a new field. Stacks and cards became primary multimedia metaphors, and HyperTalk, the program's command language, emerged as the model for multimedia scripting.

The first challengers of HyperCard—Spinnaker Plus from Spinnaker Software ($495) and Aldus SuperCard from Silicon Beach Software ($299)—imitated HyperCard's interface slavishly. Wide availability, low cost, and a clear metaphor have made HyperCard, Plus, and SuperCard the workhorses of multimedia—ideal for creating simple projects quickly.

The trade-off is that anything much more complex than card-flipping requires users to learn the scripting languages that drive each program. Scripts start simply—the statement **go to next card**, for instance, is a typical command. But they can easily grow complex, especially if you construct detailed animations or interactions. However, once users master HyperCard-style scripting, they can do things that no other authoring environment allows, such as automated creation and modification of multimedia projects.

These programs offer a bit of everything as far as basic tools go—painting, basic navigation, text entry, and database features. Plus and HyperCard allow simple animation by flipping cards, while SuperCard offers more robust animation abilities. All three programs can control external devices, such as videodiscs and CD ROM players, via external commands called *XCMDs,* written in languages such as C, then called from the program's scripting language.

HyperCard 2.1

HyperCard's popularity derives not just from the program's being bundled with the Mac; ease of use has made HyperCard a multimedia tool for the masses and spawned proliferating links to other multimedia authoring tools. Plus and SuperCard can use HyperCard stacks and XCMDs directly. Three other full-featured multimedia authoring environments—Authorware's Authorware Professional, MacroMind's MacroMind Director, and Course Builder from Telerobotics—also use XCMDs. And HyperCard forms the basis for more add-on products than have been developed for any other multimedia program.

HyperCard 2.1 allows you to open multiple stacks in variable sizes, use multiple fonts within a field, and construct your own menus, and it includes new transition effects. (For the version bundled with the Mac, be sure to type **magic** in the message box while in the last card of the Home Stack to activate the full program—otherwise you get a limited version. The bundled version comes without manuals, however. To upgrade an old version of HyperCard, or merely to obtain the manuals, you have to pay $49. The developer's version of HyperCard lists for $199.)

The new version falters in its method for adding color. To keep the basic program speedy and not lock out users of 1MB machines, Claris makes color in HyperCard look like an awkward afterthought. Instead of being an integral part of a card, color images lie on top of existing cards as separate elements. And a color element hides everything beneath it on the card—such as buttons or clickable fields. HyperCard can tell where a user has clicked only through detailed scripting. This is an inexcusable flaw, considering the smooth ways that Plus and SuperCard integrate color.

Beyond HyperCard

Plus has offered equivalents to many of HyperCard's new features for the last year and a half, and it can read HyperCard stacks directly (though not those from the 2.1 format, as of this writing). Plus also handles color with greater versatility—graphics can be included either on a card or in a background layer. You can choose one of eleven different palettes for a stack, or create a custom palette. Because of its integral use of color, Plus runs more slowly than HyperCard in black and white—but at about the same speed as HyperCard with color elements. Unlike HyperCard, Plus offers full-featured draw tools and enables the user to attach scripts to any graphic object. Unlike both of its competitors, however, Plus

does not allow users to open more than one stack at a time.

SuperCard, the most elaborate of the HyperCard-style programs, also has modest draw tools and incorporates color. In SuperCard you can open multiple windows in multiple projects simultaneously, adding flexibility for building complex applications. In developing a project on school restructuring for the American Federation of Teachers, for example, multimedia developer Bill Purdy needed to allow users to see different video clips and different text captions on the same screen. Making a different card for each example would have required too much time and memory, so he constructed separate windows for video and text.

SuperCard's basic problem lies in forcing you to work in two separate modules: SuperEdit (authoring) and SuperCard (run-time). Moving back and forth between SuperEdit (to manage and organize large projects) and SuperCard (to test scripts) is a cumbersome annoyance. SuperCard is slower for the end user than Plus or HyperCard, but again, most of the speed difference between SuperCard and HyperCard is from SuperCard's use of color.

SuperCard also supports PICS animation files and has its own accelerated animation format, called STEP. The product includes a good set of utilities (to link radio buttons and adjust the scale of graphics, for example) and, of any HyperCard-style program, has the most extensive set of tools for building projects. If you want complex projects in color and need control over multiple windows, SuperCard is a good choice.

High-End Training

In education and training, where interactive videodiscs have been used for years by corporations and the military, the ability to establish and track training procedures is more important than flashy animations or graphics. Although HyperCard-like programs offer enough flexibility to fit almost any niche—if you have the time and patience to do the necessary scripting—Course Builder and Authorware Professional are geared directly to the educational and training market.

Authorware Professional, while diverse enough for any multimedia realm, combines strong features for tracking students' progress with superb support for student testing, making it the most natural and complete product for training. And the purchase of Authorware Professional includes a session at a training center and extensive online support.

Authorware Professional uses an icon-based flowchart metaphor called the *flow line*. The space where you design the program doubles as an easy-to-follow map—the most sophisticated visual aid on the market (see "Media Maps").

EXTENDING MULTIMEDIA WITH QUICKTIME

June's announcement by Apple that it would ship QuickTime extensions to System 7 (and a QuickTime INIT for System 6.0.7) by the end of this year was exciting news for multimedia authors. QuickTime enables you to store time-based data—video, animation, and sound—on a hard drive and quickly attach it to almost any document (see "QuickTime in Motion," *Macworld,* September 1991). Apple also plans to release XCMDs that will allow QuickTime movies to be attached to any other application that uses XCMDs.

To view video from your current multimedia projects, you need a videodisc player and either a video monitor or a video-in-window board for the Macintosh. QuickTime movies eliminate the need for this extra hardware, since the files are stored on the hard drive. Current video-compression schemes allow for only small video windows (about 160 by 120 pixels) and accommodate a frame rate significantly lower than the normal 30 frames per second. But this will improve as video compression improves (SuperMac has already announced a new compression scheme applicable to QuickTime). And even a small video or animation window can add dimensions to a project that were impossible before.

Most multimedia software and hardware developers are moving quickly to incorporate QuickTime into their products. SuperMac, VideoLogic, and E-Machines, for example, have announced plans for add-in boards that will allow developers to capture and compress video in ways that exploit QuickTime. SuperMac and Diva have also announced programs that they say will allow you to edit movies and create effects that could previously be accomplished only in a video post-production studio.

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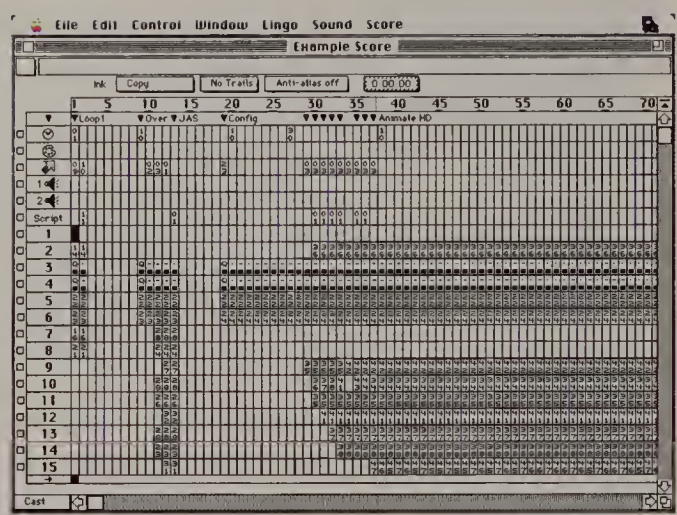
Lifemap, an interactive exhibit created in FilmMaker for the California Academy of Sciences, traces the evolutionary relationships of all forms of life. It was designed by Chris Krueger and Amy Pertschuk of San Francisco–based Arborecense.

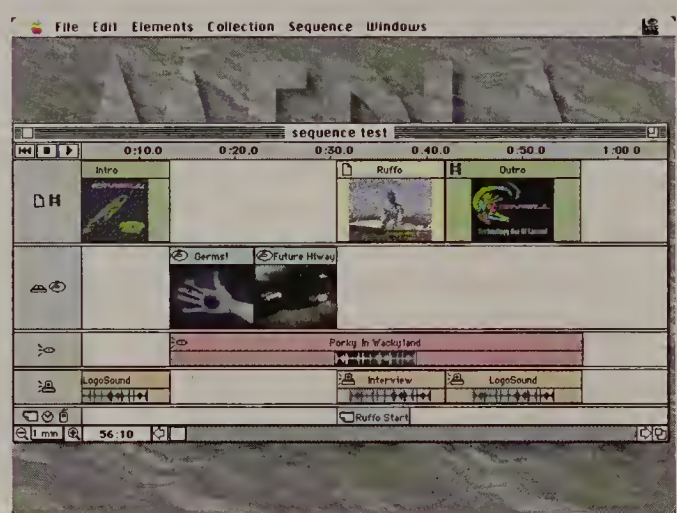
Authorware Professional has better built-in controllers for external devices than any program except MacroMind's MediaMaker (see "Partial Authoring Environments"). Authorware Professional builds in a videodisc controller (for both authors and end users) that simplifies scanning and editing discs, and smoothly integrates animation. Although Authorware Professional cannot create sound or PICS animation files, it can import these from other applications.

Overall, the program is moderately easy to learn and powerful enough to handle almost any

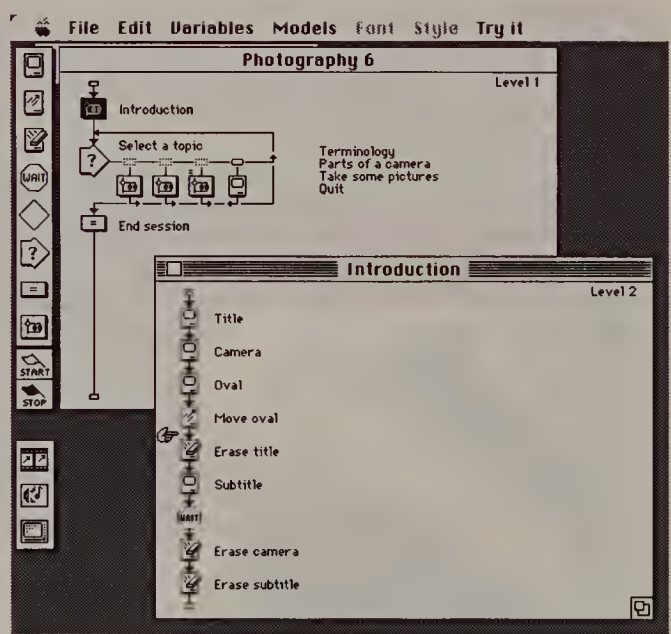
MEDIA MAPS
Each authoring tool offers a different approach to the "you are here" challenge.



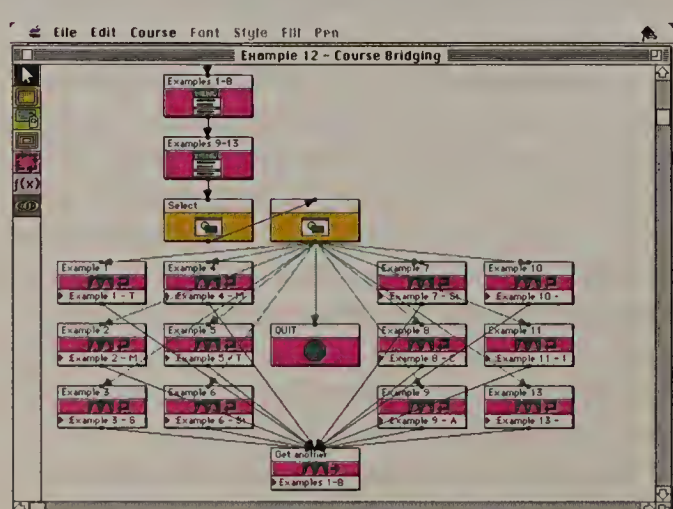
Director's score window is a time-line–based system that can be daunting at first, but allows pinpoint control to experienced users.



MediaMaker's icon-based time line improves on Director by making sequencing and interaction apparent at a glance. The size of the icon corresponds to the length of the segment.



Authorware Professional's superb flow line progresses according to program organization rather than time. Elements are manipulated through dialog boxes, and a section of the flow line can be collapsed into a single icon in order to view the entire presentation in shorthand form.



Course Builder's course map uses a similar system, but without Authorware Professional's clarity. Arrows represent entry and exit routes for each segment.

multimedia need—except where complex custom scripting is required. It definitely provides the best tools for organizing a large project, and it includes excellent graphics tools. So why doesn't it sweep the market? In a word, money. Authorware Professional lists for $8000 ($995 for educational institutions)—more than any program except Warren-Forthought's Linx Industrial ($9000), and $6500 more than the next-most-expensive program reviewed here. Unless $6500 represents a small fraction of your project budget, Authorware Professional's advantages hardly seem worth it.

Course Builder

Course Builder resembles Authorware Professional, especially in its emphasis on educational uses. Course Builder provides similar control over tracking and responding to student input.

The main metaphor of Course Builder is the *course map* (see "Media Maps"). To create a course, the author chooses from various *states* (such as graphics or video) and connects them with routes on the map. The map metaphor does not organize projects as clearly as Authorware Professional's flow line, however.

Course Builder avoids a scripting language; the author makes all choices through dialog boxes. This makes the program easy to use but restricts authors to creating within Course Builder's relatively limited bounds. The program falls down particularly by failing to integrate video and animation smoothly. And Course Builder lacks a valuable aid to project development offered by Authorware Professional—the ability to run selected parts of programs. With a list price of $1495 ($995 for educational institutions), Course Builder is a good choice only if you must have excellent student tracking and can't afford Authorware Professional.

Presentations and Archiving

More than multimedia training projects, multimedia presentations need to integrate animation, video, and sound to make an effective point. Presentations emphasize graphics and animation rather than the branching and tracking that are important to training applications. Linx Industrial and Director offer distinctive approaches to creating presentations.

Director includes tools for creating high-end animations for presentations with varying degrees of interactivity, from the simple to the sublime. The Overview module allows casual users to sequence multimedia objects that were created in other programs and put mouse-clicks or delays between them. This is all many presenters need.

The Studio module of Director is difficult to learn but offers much more flexibility than the

Overview module. It's built on film metaphors. A *cast* window contains multimedia objects: text, graphics, sounds, film loops, and scripts. The *score* window serves as Director's multimedia map and control panel (see "Media Maps"). Within the score, you choreograph multimedia objects through time—animating them across the screen, activating scripts, changing palettes, or making transitions. The ability to animate 24 separate objects simultaneously offers the potential for dazzling presentations. Although this process takes practice, it's worth the effort.

Credit Director for its relative ease in creating animations from static graphics, including 2-D or 3-D objects imported from other programs. Director provides tools for animating a series of graphics automatically, animating frame-by-frame, or recording an animation in real time. You can also choose from several in-betweening options that allow users to define the beginning and end of an animation, and then have the program draw the gradually changing images.

For editing graphics, Director offers a full-featured paint program, but limited drawing tools. Unlike some other programs, Director lets you create graphics in 24-bit mode. Without a faster Mac or an accelerator, though, most animations constructed with 24-bit graphics run far too slowly for presentation in real time.

Director also rivals HyperCard-style programs in its sophisticated interactive control. Director includes Lingo, a scripting language similar to HyperTalk; and XObjects extend Lingo, much the way XCMDs extend HyperTalk. Scripts can be attached to any object or frame within an animation. Director also includes a Link to File option that lets you attach separate sound or graphics files, or other Director movies, to a presentation without adding to your movie's size.

Making Connections

Linx Industrial provides several interesting presentation tools—and adds tools for archiving and connecting previously produced multimedia material in a way that resembles and expands on Director's Link to File option. Instead of taking megabytes of sounds, animations, and graphics and pouring them into one multimegabyte project, Linx leaves all the pieces exactly where they were before—on any hard drive or network volume that your computer can access. The program merely links these parts together by adding instructions to the resource fork of each file.

This method offers several advantages. You save storage space because you don't need to include duplicate graphics files in a multimedia project, and you can update files without digging into the depths of the project. This helps where thousands of screens need to be archived and continually updated. Linx was originally designed, in fact, to help petrochemical plant managers keep track of and make available a multitude of diagrams and operating procedures.

Linx Industrial also provides presentation options that could be useful for trade-show projects. The program controls up to six monitors simultaneously and can split each of these monitors into nine zones. Each monitor or zone can display a separate graphic or animation.

The Linx approach to authoring suffers from some rough edges, however. Linx can be frustrating to use, making you place all Linx application files directly on the Mac desktop—a maddening way to increase access speed. And many paint programs, for example, wipe out the resource fork of a graphics file (where Linx stores its instructions) if you use the Save As option (you must use the Save option). The price is also the steepest of any authoring environment—$9000. As *Macworld* went to press, Warren-Forthought introduced Linx Lite, a $239 product. It does not support multiple monitors, video output, video-

CROSS-PLATFORM DEVELOPMENT

A much-discussed but little-developed idea in multimedia authoring is cross-platform development—building a project that works both on the Macintosh and on DOS computers. Spinnaker Plus and Authorware Professional already have versions that run on DOS computers and read Mac multimedia files directly—except for XCMDs, which have to be recompiled on DOS machines. MacroMind makes a Windows run-time version for Director. (And Telerobotics says Course Builder will have a Windows run-time version by the time you read this.) Even in these cases, however, cross-platform development tends to be a labor-intensive custom job.

And after all the work, porting multimedia projects from the Mac may prove disappointing. Because the graphics and animation performance of the most popular DOS machines lags behind that of the Mac, projects may run too slowly on all but high-end DOS machines. Generally, DOS machines lack even rudimentary sound capabilities, so users must add third-party boards—many of which are not reliably compatible with Macintosh sound standards. Because color palettes in the DOS world are not standardized as they are on the Mac, colors may shift, distorting the presentation.

Microsoft and several computer manufacturers recently announced standards for a "Multimedia PC" and a set of multimedia extensions to Windows 3.0. This will probably bring a greater degree of standardization within the DOS world, but won't make it much easier to simultaneously publish multimedia applications on both platforms. The recently released Tigre Programming Environment (Tigre Object Systems) is a hopeful development, however. The product offers many tools that multimedia authors will recognize, and creates applications on the Mac that can instantly run under Windows or on many Unix machines. Tigre Programming Environment is based on Smalltalk programming language, though, which has a steeper learning curve than multimedia scripting languages. And Tigre costs $7000, including the Smalltalk license.

And at this point, people are just beginning to explore ways to move multimedia between the Mac and the Amiga, Next, CD-I, or CDTV platforms. So for the time being, multimedia applications that operate on more than one platform will be written separately, at least in part, for each.

FULL-SERVICE MULTIMEDIA TOOLS

	HyperCard	Aldus SuperCard	Spinnaker Plus	Authorware Professional	MacroMind Director	Linx Industrial	Course Builder
Company	Claris Corporation	Silicon Beach Software	Spinnaker Software	Authorware	MacroMind *	Warren-Forthought	Telerobotics International
Price	$199	$299	$495	$8000 †	$995	$9000 ‡	$1495 †
GRAPHICS							
Draw tools	○	●	●	minimal	minimal	○	●
Paint tools	●	●	●	○	●	○	●
Color							
Integrated or add-on	add-on	integrated	integrated	integrated	integrated	integrated §	integrated
Palette selection	○	●	●	●	●	○	● ‖
Displays 24-bit graphics	●	○	○	○	●	●	○
Number of transitions	25	20	8	3	54	8	13
Ink effects	○	●	○	●	●	○	○
Object grouping	●	●	○	●	○	○	●
Built-in animation	○ #	●	○ #	●	●	○	●
MEDIA INTEGRATION							
Graphics file formats imported	PICT	PICT, TIFF, MacPaint	PICT	PICT	PICT, Glue, Scrapbook, MacPaint	PICT	PICT
External sound-file support **	none	none	none	SoundWave, Audio IFF	Audio IFF, SoundEdit	SoundEdit	MusicWorks
Built-in videodisc controller	○	○	○	●	○	●	●
TRANSPORTABILITY							
HyperCard can control	NA	○	○	○	●	○	○
Reads HyperCard stacks	●	● ††, #	● ‡‡	○	○	○	○
Uses XCMDs and XFCNs	●	● §§	● §§, **	● §§	●	○	● §§
Uses other extensions	○	○	●	●	●	○	●
PC version of program available	○	○	●	●	●	○	○
AUTHORING							
Main metaphor(s)	stacks of cards	stacks of cards; windows	stacks of cards	flowchart	film score	links	map
Scripting language	●	●	●	○ ‖‖	●	●	○
Debugging facility	●	●	○	●	●	○	○
Visual map	○	○	○	●	●	○	●
Customizable menus	●	●	○ ##	●	●	○	○
Multiple windows	●	●	○ ##	○	●	●	○
OUTPUT							
Print output	screens, reports	screens	screens, reports	screens	screens, scripts, five others	screens	screens, reports, course maps
Built-in support for video output	○	○	○	○	●	●	○
Creates stand-alone applications	○ ***	●	○ †††	●	●	○ ‡‡‡	●

*● = yes; ○ = no. * MacroMind and Paracomp recently announced that they will merge; the names of both companies' products may change. † $995 for educational institutions. ‡ A limited version of this program, Linx Lite, sells for $239; it has a limited scripting language and does not support video output. § All PICT files exist separately from the program and have their own colors. ‖ Allows only one palette per project, but can be changed. # Card-flipping can be used to create simple animations. ** Sound resources can be imported by all programs. †† Converts HyperCard stacks to SuperCard format. SuperCard 1.5 will convert HyperCard through version 1.2.5. SuperCard 1.6, which should be available when this appears, should be able to convert HyperCard 2.1 stacks. ‡‡ Will read HyperCard stacks through HyperCard version 1.2.5. §§ Cannot use some HyperCard-specific XCMD and XFCNs, or any from HyperCard version 2.1. ‖‖ Limited scripting possible in calculation icon only. ## Multiple windows can be open and customized menus can be created with separate XCMDs or XFCNs only. *** Program bundled with all Macintoshes sold since August 1987; no stand-alone needed with those machines. ††† Run-time version of Plus must accompany Plus stack. ‡‡‡ Copies of all graphics, text, and sound files must accompany supplied run-time version.*

in-window boards, or any external device other than Pioneer's Laserdisc players and NEC's PC-VCR. Linx Lite supplies only a partial scripting language. But if you can live without those features, Linx Lite is an excellent value.

The presentation possibilities of multimedia don't stop with these full-fledged authoring environments. Multimedia has spread to programs that have multimedia elements but don't provide complete authoring environments (see "Partial Authoring Environments").

Distributing Your Project

Once you've created a winning multimedia project, how do you distribute it to colleagues or customers without violating the authoring program's copyright?

One solution is to turn your project into a stand-alone application—a single file that users can double-click on to start. (Bear in mind that these files might be very large because they include all the graphics, fonts, sounds, and other resources that your project requires.) SuperCard, Director, and Course Builder all permit the creation of such applications at no extra cost. Authorware Professional grants free licenses to educational institutions or nonprofits, and negotiates licensing fees for others.

For $495, you can purchase a run-time version of Plus that lets users read multimedia

projects without being able to author any of their own. Linx Industrial comes with a run-time version at no extra charge. (HyperCard achieves nearly the same result, since it's been bundled with every Macintosh since 1987.)

The Crystal Ball

The last few years of trying out various authoring schemes have shown users that nothing can replace simplicity and clarity. Look for easy-to-use programs to crowd out more full-bodied but more complicated competitors. Along these lines, KnowledgeVision of Myrtle Beach, South Carolina, has announced PowerVision, and Paracomp has announced Magic. Both products are icon-based, low-end multimedia authoring tools that will not require scripting. Both companies plan to ship later this year. And Vividus plans to release Cinemation by the end of the year. The company says the product will offer an easy-to-use interface in a kind of poor-man's Director.

I'm waiting for an authoring map that effectively combines a time line showing how sequences are synchronized and a flowchart that offers a quick overview of organization and structure. Point of View, a $795 product by Learningways, takes a stab at this problem by allowing multiple, time-based windows containing text, animation, sound, or video to be controlled simultaneously from a time-line window. Point of View should be available by the time this article appears.

Meanwhile, advances in video- and graphics-compression technology should slim down the giant file size of many of these projects. Until better compression schemes emerge, many serious multimedia authors may find that their space-hungry products require optical storage devices. System 7's Publish and Subscribe features could stimulate other programs to follow Director and Linx's lead and connect multimedia parts into a seamless whole without duplicating huge files.

Authoring environments will also have to build more flexible hooks to other programs—perhaps including shared XCMDs, universal formats, or files that can be traded easily across platforms (see "Cross-Platform Development").

If software developers make these improvements, multimedia authoring could transcend marketing hype and become a broad-based, versatile communications tool. ■

See *Where to Buy* for contact information.

***Nick West** designs interactive projects for Media 360, a multimedia consulting, production, and development company in San Francisco. He is currently working on a virtual reality installation based on the Cyberthon conference.*

PARTIAL AUTHORING ENVIRONMENTS

The increasing popularity of multimedia can be measured by the many programs that contain multimedia elements but aren't full-fledged authoring tools. The following array of tools shows how diverse multimedia applications can be—and how difficult it is to define where multimedia begins and ends.

OWL International's Guide 2.0 ($295), which predates HyperCard, is a text specialist. With various types of buttons Guide links text blocks to other text blocks and graphics. It can import graphics that other programs create, but it can't display animations or video in a Macintosh window. And Guide controls videodiscs by an inferior method—low-level commands through the serial port.

Opcode Systems' Max ($399.95) provides musicians with a visual "construction set" for MIDI patches, and split-second timing for any MIDI-controlled event. The most recent version of Max adds control over videodisc events.

Farallon's MediaTracks ($295) allows you to collect sequences of Mac screens and annotate them with digitized sounds. The technique is perfectly designed for computer training. MediaTracks can't capture color screens, and it limits interaction to branching between sequences of screens. But it can be controlled from any program that uses XCMDs, allowing the use of MediaTracks clips in more-sophisticated authoring environments.

Paracomp's FilmMaker ($695) is a specialized animation tool with extreme authoring trade-offs. FilmMaker has some deficiencies: it is difficult to learn, it offers extremely limited interaction, and you can't create graphics in it. Once animations are completed in wire-frame form, each frame requires between ten seconds and two minutes to compile in 8-bit color. Yet FilmMaker offers unsurpassed control over animation, and the program's dithering, antialiasing, and antiflickering options combine to produce ultrasmooth video images that are worth the wait. Finished animations can be run from HyperCard or output to videotape.

MacroMind's MediaMaker ($695) provides sophisticated tools for sequencing and recording multimedia presentations to videotape. The program allows only rudimentary user interaction and can't be controlled from other programs. But its two interface innovations would be useful in any multimedia program: a complete set of driver software lets you easily combine input from many different devices—including videodiscs, VCRs, video cameras, and overlay boards. (A similar set of drivers may become widely available if Apple releases its planned Advanced Device Control updates to QuickTime next year.) MediaMaker also features a highly intuitive method of sequencing multimedia elements visually, based on a time line that is superior to Director's (see "Media Maps").

Whitney Educational Services' VideoDiscWriter ($389), a HyperCard add-on, helps create educational presentations with videodiscs. Its own command language simplifies branching, scoring, and other educational tasks. The product's utilities help you incorporate digitized sound, type overlay text onto the video screen, and keep track of videodisc segments.

HyperPro's VideoAuthor ($395) excels at organizing videodisc segments. When combined with a video-in-window board, VideoAuthor makes editing and cataloging video clips a snap. With additional scripting, VideoAuthor creates HyperCard windows that can handle color PICT files and video inserts.

BY DAVE KOSIUR

Building a Better Network

HOW TO AVOID GROWING PAINS AS YOUR NETWORK NEEDS INCREASE

Networks often grow like topsy. A few Macs appear in one department; more show up down the hall. Soon everyone, Mac and PC users alike, start clamoring to exchange files and mail. Setting up a network from scratch is tricky enough. Adding to it later can lead to nightmares. Careful planning based on understanding the ins and outs of your network configuration can help avoid those nightmares and even improve your network's performance.

As more and more users send E-mail and access printers and file servers, a network begins to bog down. Sometimes it just stops dead. Frustrated coworkers rediscover telephones and floppies. Productivity wanes. Unless, of course, you identify and clear the bottlenecks in your burgeoning network. In this article I outline a number of common networking problems and offer solutions—many of them quite inexpensive.

JIM LUDTKE

Topological Maps

The layout, or topology, of your network can have as much effect on network throughput as any other factor. That's because the topology affects how the electrical signals that represent your data are transmitted on the wires and how quickly those signals can degrade or get lost.

There are three basic ways to design a network: *daisy-chain, bus,* and *star topologies.* Each has advantages and potential quagmires. Sometimes you can shore up an existing network; sometimes you have to upgrade. (For an overview of each of these network types, see "Networking for the Novice," *Macworld,* December 1990.)

PHOTOGRAPHS BY ROBERT HOLMGREN

To keep traffic flow smooth among its 250 nodes, the law firm McDonough, Holland, and Allen in Sacramento, California, has split its users into zones based on what departments they work for. Each node has its own branch, which gets routed to a panel in the network control room (top). The panel works like a switchboard, connecting each branch to the active star controller hub for that node's zone. By changing the connections in the panel rather than rewiring the controller hubs, the administrator can easily reconfigure the network when people move. Each zone also has a dedicated file server; all the servers are centrally located (bottom) for easy management.

Constructing a daisy-chain network is a cinch—especially if you use Apple's LocalTalk cabling system, Farallon Computing's PhoneNET Connectors, or Nuvotech's TurboNet ST connectors. Simply plug one network connector box into each Macintosh, join the boxes with the appropriate cables, and the network is ready to go (that is, until one of the connectors jars loose or someone accidentally snaps a cable).

Using a bus topology, also called a backbone topology, eliminates the snarl of wires that distinguishes a daisy-chain network. Backbone cabling is generally installed in office walls, and connectors to individual computers are plugged in at wall plates, much like phone lines. The gauge of the wire used for cabling determines the maximum length of the network (see "Network Limits"). Wire diameter is particularly important because the thinner the wire, the more resistance a signal encounters and the less distance it can travel. Common wire diameters are 22, 24, and 26 gauge. The numbering scheme is counterintuitive: the higher the number, the thinner the wire. Because a bus topology generally requires modifying buildings, it is often restricted to small workgroups.

Star topologies unite a group of computers at a central point, generally in the office phone closet. Each computer plugs into the nearest telephone wall plate, taking advantage of two extra wires that exist in phone cables. At the central point, or *hub,* all the network wires join in a star, which can be either *active* or *passive* (see "Passive Stars versus Active Stars").

The basic difference between the two stars is that a passive star is like a bus network folded back into itself in a star pattern, while the active star is like a series of bus networks connected at the center but isolated electrically from each other, letting each branch act electrically as an individual network. (All the branches in either star still make up a single AppleTalk network.)

Passive stars are limited and can often be more trouble than they're worth. Branches of a passive star are linked by jumpers at the hub. Because the branches are not electrically isolated from one another, the combined length of all the branches is limited to the maximum length allowed by the wire gauge used. Also, because each additional branch further reduces the network signal, a passive star can handle only a certain number of devices. For example, Farallon recommends no more than 16 devices on a three-branch passive star of 1800 feet, while a backbone network of the same length can support 48 devices. The limits for your network will depend on the type of wire used.

You're better off converting to an active star topology, if you can afford it, since it uses a *star controller* to electronically increase the maximum distance of your network (see "Passive Stars versus Active Stars"). Examples of star controllers include Farallon's PhoneNET StarController ($1295) and Nuvotech's Turbostar ($1295). A star controller, also called an *active hub,* installs in the phone closet, and electronically isolates one branch from another. An active star topology is more reliable and allows longer branches because its active hub uses a *multiport repeater* to amplify the network signal as it travels from one node to another. The maximum length of each branch in an active star depends on the controller used and the wire gauge; 3000 feet is typical.

Passive to Active?

How do you know if you're on the ragged edge and need to convert from a passive star to an active one? If users complain that LaserWriter and AppleShare server icons disappear from the Chooser, an overlong network may be causing the signal to weaken. LaserWriter jobs that are canceled due to a timeout, which means that the printer isn't acknowledging data within set time limits, may be another symptom of overlong network branches.

If only one Mac exhibits this type of behavior, however, its cable may be too long. Sometimes installing a *re-*

peater, which amplifies the signal for that branch, solves the problem. But if more than one Mac is experiencing similar problems, install a star controller; it acts as a repeater for all the branches.

Toolbox Solutions

Software-based network-analysis tools like Technology Works' GraceLAN and Apple's Inter Poll Network Administrator's Utility are good for testing whether a particular networked Mac or other device is having problems. The test consists of sending *echo packets* from a Mac to the problem Mac or LaserWriter; you count packets returned to gauge whether your network is having problems. If 2 or 3 percent of the packets don't return, that's OK; but if 10 percent or more don't make it back, you're looking at a problem.

If a device is missing from the Chooser's list of network devices presented by GraceLAN or Inter Poll, you probably have a break in the network. Check the connectors (one might be loose) and the cables. If a device periodically appears and disappears from the list in the Chooser, your network may be too long. As a diagnostic, run Inter Poll or GraceLAN from a Mac at one end of the network and send echo packets to each device on the net. The amount of time necessary to return echo packets increases as you communicate with devices farther from the test Mac. As you reach the network's length limit, some devices may begin losing packets; this is when you ought to consider installing a repeater.

One last thing: if these problems occur even though you're within the proper length limits, you might have an improperly terminated network—with too many or too few terminating resistors (see "How to Avoid Common Wiring Woes"). A missing terminator leads to reflections of the signal within the wiring that interfere with the network signal; too many terminators, particularly on a passive star, weaken the network signal and make it harder for distant devices to communicate.

Isolating your resource-hogging users into zones may be the answer to traffic problems

Traffic Jams

If, after confirming that the wiring is properly installed and that all connections are solid, you still have network traffic problems, try analyzing the network's information flow. Do some users regularly send large jobs to one printer? Do network hogs store large files on a particular server? Isolating these users with *zones* may be the answer.

AppleTalk's network zones logically group users and networked devices, such as printers and file servers. To create a zone, you need a *router,* such as Apple's AppleTalk Internet Router, Farallon's PhoneNET Liaison, Nuvotech's TurboBridge, or Shiva's NetBridge. (A few EtherTalk routers include Cayman Systems' GatorBox and Shiva's FastPath5; for more details on EtherTalk routers, see "Going the Ethernet Route," *Macworld,* April 1991.) After you install the router and assign names to each network zone, the new names show up in the Chooser.

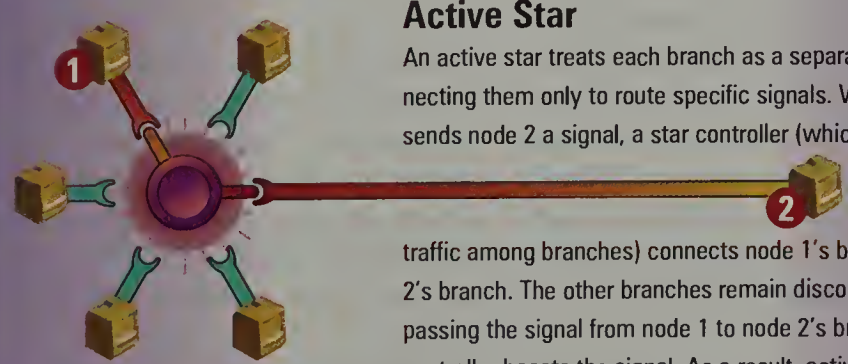
Assign heavy users to the same zone as the file servers or printers they use most often. Assign other users to another zone or zones. Once a router is installed, traffic generated by the heavy users does not affect the other users. The two groups can still communicate with each other and share devices when necessary, but the router does a good job of optimizing network traffic.

Passive Stars versus Active Stars

Although both are star topologies, passive and active stars differ greatly in how they work and how long they let you make a network.

Passive Star

A passive star is simply a set of branches connected at a central point. Electrically, the entire star is one wire: when node 1 sends a signal to node 2, the signal travels everywhere on the star. The signal weakens quickly because it must pass through all the wire in the network, as the change in signal color from red (strong) to orange (weak) illustrates. Wire resistance combined with the absence of any mechanism to route signals limits the network's length. Increasing the number of branches in a passive star also limits the length of individual branches.



Active Star

An active star treats each branch as a separate entity, connecting them only to route specific signals. When node 1 sends node 2 a signal, a star controller (which referees traffic among branches) connects node 1's branch to node 2's branch. The other branches remain disconnected. While passing the signal from node 1 to node 2's branch, the controller boosts the signal. As a result, active stars can be much longer than passive stars. Because the branches are separate, their maximum lengths are unrelated to the active star's total length.

HOW TO AVOID COMMON WIRING WOES

Getting the wiring right can be a full-time job, especially for larger networks. With twisted-pair wiring for AppleTalk, there are two cautions. First, older connectors marketed by Apple disconnect easily, which isolates parts of a network or causes it to go down altogether. The newer LocalTalk Locking Connectors do a much better job.

Farallon's PhoneNET connectors never had this problem; they use RJ-11 modular plugs (just like the ones in a standard phone system). However, creating a daisy chain with PhoneNET connectors requires having a terminating resistor at each end of the daisy chain.

Terminating resistors prevent reflections of the electrical signals within a network (reflections appear as noise or stray signals). Be careful not to install too many resistors, since each resistor absorbs signals. Having too many resistors degrades performance and requires you to reduce the total cable length to compensate.

You don't have to worry about the number of terminating resistors on daisy chains and other single-branch networks, since there are only two terminals—one at each end. Likewise, this is not a concern for active stars, since each branch is electrically separate. But placing terminating resistors in a passive star can be tricky because you have to consider the number of terminators across the whole star, not just across each branch. Farallon recommends installing a resistor at the end of each branch of the passive star, but you should never have more than a total of four resistors in this topology, no matter the number of branches.

Many of the newer connectors (including those from Nuvotech and Farallon) are self-terminating, so be careful mixing and matching connectors. The general tendency is to install a single device (Mac or LaserWriter) per branch of any star for better control and debugging of the network. This is, in fact, how the telephone system usually works—each line is a single branch with one node: your phone. The self-terminating connectors fit in well with this approach. (In fact, one of Farallon's connectors, the PhoneNET StarConnector, has only one socket and cannot be used in a daisy chain.)

Consider using Farallon's TrafficWatch II to check up on a network's traffic patterns. The program shows the amount of traffic generated between any two devices. The Excel macros included with TrafficWatch II analyze the data and make it easy to determine which network nodes are generating the most traffic. Two other tools that monitor traffic between nodes on an Apple LocalTalk network are AG Group's LocalPeek and Neon Software's NetMinder LocalTalk.

If you plan to install routers on your network, it's important to understand the kinds of traffic that will pass through each. For instance, avoid having a workgroup on one side of a router use a file server that's on the other side. Also, if some users transfer files regularly (with Caravelle Networks' Mac-to-Mac, Gizmo Technologies' Send Express, or System 7's file-sharing feature, for instance), minimize the number of routers between these parties. One way to facilitate this is to create a LocalTalk backbone and attach all the routers to it; you can also use an Ethernet backbone (see "Faster Traffic Flow").

Another way to isolate network traffic between workgroups is to use Tribe Computer Works' LocalSwitch star controller. Using packet-switching technology, the LocalSwitch isolates LocalTalk traffic on each of its 16 ports without the use of routers. Traffic flows from one port to another independently of traffic traveling between other ports of the LocalSwitch, thus forming, in essence, two or more independent networks (the 16 ports can handle up to eight networks). Since it's not a router, the LocalSwitch does not provide any zone-naming facilities for the network, so all the devices attached to the LocalSwitch are in the same zone, which can make it harder to find nodes in crowded dialog boxes or large networks.

To alleviate network stress, find ways to share files that do not require using a file server

Spooling Along

Many users rely on print spoolers and servers—devices that store information and communicate with a printer—to minimize the time that their workstation is tied up with a print job. If you use PostScript printers, Apple's background print monitor under MultiFinder is one way to regain use of your Mac while a job is printing.

Some people install a print spooler—for instance, AppleShare Print Server, which runs on an AppleShare server—on a separate Mac. This setup generates more network traffic than the previous one, however, because the Mac first sends the print job to the print server; then the print server communicates with the printer. If file translation takes place (from QuickDraw to PostScript, for example), the network is tied up even longer.

To make a print server work effectively, you should put it and the printer on a network of their own so their heavy traffic does not interfere with other nodes' traffic. You could

install a router, such as Liaison or Apple's Internet Router, on the print server to separate the printer's network from the others. (This also works well if you want to connect a laser printer to an Ethernet network.)

To Serve You Better

Sharing printers aside, the next-heaviest use of networks involves sharing and transferring files. To alleviate network stress, find ways that don't require a file server to share files on a network; try one that uses programs like Mac-to-Mac or SendExpress. With such programs, you can even do transfers in the background and move on to other jobs.

If you have an electronic-mail system installed, you can send a file as an enclosure with a mail message. E-mail offers the added advantage of storing an enclosed file on a server so that it can be retrieved later by co-workers who weren't around when you sent the file.

If, on the other hand, you want to maintain only one copy of a file, then store the file on a file server and let others access that file directly over the network.

There are two types of file servers: *distributed* and *centralized*. Distributed file servers for the Mac first became popular with TOPS (Transcendental Operating System), which brought the added advantage of supporting both Macs and DOS computers. With TOPS, each computer is both a file server running in the background and a client of other file servers (other Macs on the network, for example). As a file server, your Mac can give other users access to certain files stored on your system; in many cases you and your client may use the file at the same time.

With System 7, Apple offers Mac FileShare—a program that combines many TOPS features with those of Apple's AppleShare file server. DOS computers (and Macs running under System 6.0.X) can act as clients accessing files on Macs with Mac FileShare but can't make their own files available to others.

A distributed file server running in the background is fine for sharing small files (or midsize files that are transferred only occasionally). But putting large accounting or sales databases on a distributed network is going to bog down the system.

A centralized (or *dedicated*) server is a Mac (or DOS computer) that handles file sharing and may also act as a print server or E-mail server; no one uses it as a workstation. A dedicated server can devote more resources to processing file requests, which means users experience less delay, since their machines' resources are left available.

Troubleshooting with Servers

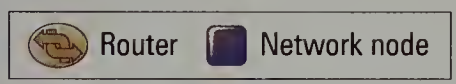
You know the server is overloaded if network access to the server is slow when more than two or three people are using it. To determine how slowly a network is dragging its feet, try using Inter Poll. As in the diagnostic mentioned earlier, start by sending echo packets. If the packets take significantly longer to return when users are accessing a database on the server than when they aren't, you may need to upgrade the server's CPU.

If you're already using a IIcx or IIci for your server, you generally don't need to upgrade to a IIfx. As you increase the horsepower of the Mac, Apple's system software offers very little increase in performance for file transfers using the SCSI ports. Unfortunately, the same is true for System 7. (Switching from a Mac Plus or SE to an SE/30 or IIci works wonders, however, because the older Macs had even slower SCSI ports.) SCSI accelerator boards can help, but usually by no more than 10 to 30 percent on a high-power Mac. There is one situation that definitely warrants upping the horsepower of a Mac server—when it houses a database that requires a lot of computation.

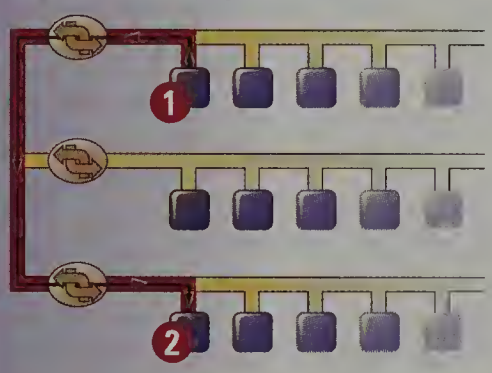
A few final notes on upgrades. Given the choice between upgrading

Faster Traffic Flow

How you connect multiple networks affects traffic speed. You install routers to control when each signal passes from one network to another—routers act like traffic-control lights at intersections. When you plan a router's placement, first identify the traffic patterns (who communicates with whom and in what volume). Then connect networks in a parallel configuration, which minimizes delay between networks by reducing the number of routers that traffic must go through. Every time a message encounters a router, it can be delayed until earlier message traffic clears.

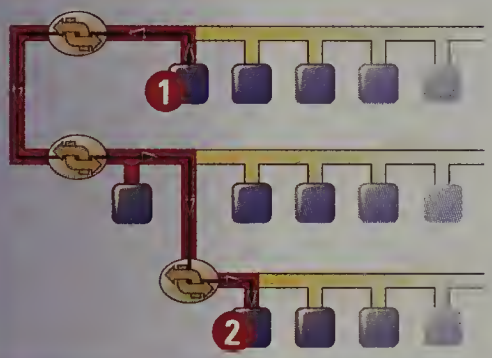


Routers in Parallel



A parallel layout reduces the number of intersections a signal goes through. In this layout, when node 1, on the top network, sends a signal (indicated in red) to node 2, on the bottom network, the signal passes through two routers, each of which connects its network to a backbone. The middle network and its router are avoided entirely, as are potential traffic delays there.

Routers in Series



A serial layout adds extra intersections for a signal to pass through. In this layout, when node 1 sends a signal (indicated in red) to node 2, the signal must pass through three routers: one connecting the top network to the backbone, one connecting the middle network to the backbone, and one connecting the middle network to the bottom network.

10 WAYS TO IMPROVE YOUR NETWORK

- Keep the printer and print spooler on a separate network so their heavy traffic doesn't affect other users.
- Use Ethernet to transfer large files (for example, images), since it is faster than other network types.
- Use routers to separate heavily used networks from lightly used networks.
- Try to keep no more than one router between users and the services they use regularly. This prevents unnecessary delays.
- Speed up file servers by adding fast hard drives, not more memory. Use 2MB of RAM for regular file servers; add more RAM only if you are adding other services (for example, E-mail) to those servers.
- Don't load all your services on one server. Use other Macs as servers for different tasks (such as E-mail and conferencing) if the services are to be used heavily.
- Place large, heavily used files (such as large databases) on a dedicated file server, not on a distributed server.
- Know how your network operates when it's healthy. This will help you diagnose problems more easily when they occur.
- Put as much RAM as possible on your printer; this will speed its acceptance of users' print jobs.
- Don't launch applications from a server when on LocalTalk, since this ties up the network and slows everyone down.

a server or a workstation, upgrade the workstation (as long as the server isn't a Mac Plus, Classic, or SE). A faster hard drive on the server can help, particularly if it hosts a large multiuser database. As for memory, servers rarely benefit from more than 2MB of RAM, unless they're also running another program, such as E-mail or print spooling, with the server software.

NETWORK LIMITS (wire length, in feet)

	Daisy Chain	Backbone	Passive Star*	Active Star**
22-gauge wire	not recommended	4500	4500	36,000
24-gauge wire	not recommended	3000	3000	24,000
26-gauge wire	1800	1800	1800	18,000

** Maximum length per branch is total network length divided by number of branches.*

*** These figures are for a 12-node network. Regardless of how many nodes, the limit per branch is 3000 feet.*

Both the network topology and the wire gauge (diameter) determine a network's maximum length. The length is limited because signals degrade as they pass through wire. After a while, the amount of resistance makes the signal too weak.

Driving in the Fast Lane

Even with centralized servers you can run into problems. Large graphics files (1MB to 4MB) can take a long time to open over a LocalTalk network. And you wouldn't want to transfer many such files on a LocalTalk network with a program like Mac-to-Mac. The network would be too slow, even under the best of conditions.

If your network regularly accommodates large graphics files or large databases, consider upgrading (if you haven't already) from LocalTalk to Ethernet. Ethernet lets you transfer data three to five times faster (see "On the Ethernet Highway," *Macworld,* March 1990), and its greater bandwidth (10 megabits per second versus LocalTalk's 230 kilobits per second) lets more users access the network within a given period of time.

I've covered Ethernet in past articles (*Macworld,* March 1990 and April 1991), so I'll add only a few comments here. First, all network users do not need to be on Ethernet. Just as you can use a router to isolate heavy users from light users, you can isolate heavy users on Ethernet. If a server is located on Ethernet, and some (non-Ethernet) users need to access the server occasionally, you can connect the LocalTalk network to the Ethernet network with an EtherTalk router.

For networks already wired as active star topologies, it's relatively simple to convert to Ethernet using any of the active hubs now made for 10BaseT Ethernet (the ANSI standard for running Ethernet on unshielded twisted-pair wiring). With Ethernet, the length restrictions are more severe (100 meters versus 1000 meters per branch) and the signals are more susceptible to outside noise from such sources as copy machines and even fluorescent lights. Also, your wiring may be too thin, so if you are using existing telephone wiring, it's a good idea to test the line to see if it is sufficient for Ethernet.

Be forewarned that few laser printers directly support Ethernet. There are two ways to get around this. First, use Dayna Communications' EtherPrint as the interface between a laser printer and Ethernet. Or on a Macintosh acting as a print spooler, use a software router (such as Liaison or Internet Router) to route traffic between the LocalTalk network containing the spooler and printers and the Ethernet networks. This last alternative is particularly attractive, since all the users can dump their print jobs to the spooler, and traffic between the spooler and the printers is restricted to the LocalTalk network.

Final Call

Above all, plan carefully, both when you're starting a new network and when you're upgrading an existing one. Keep track of which users are accessing which file servers, E-mail servers, and printers. And measure network traffic periodically, at different times of the day (to catch both light and heavy network usage), to get a feel for the network. If you don't know how your network behaves when it's healthy, how can you tell when it's sick? ■

See *Where to Buy* for contact information.

***Dave Kosiur**, a* Macworld *contributing editor, is the editor and publisher of* Connections, *a newsletter concerned with Mac networking.*

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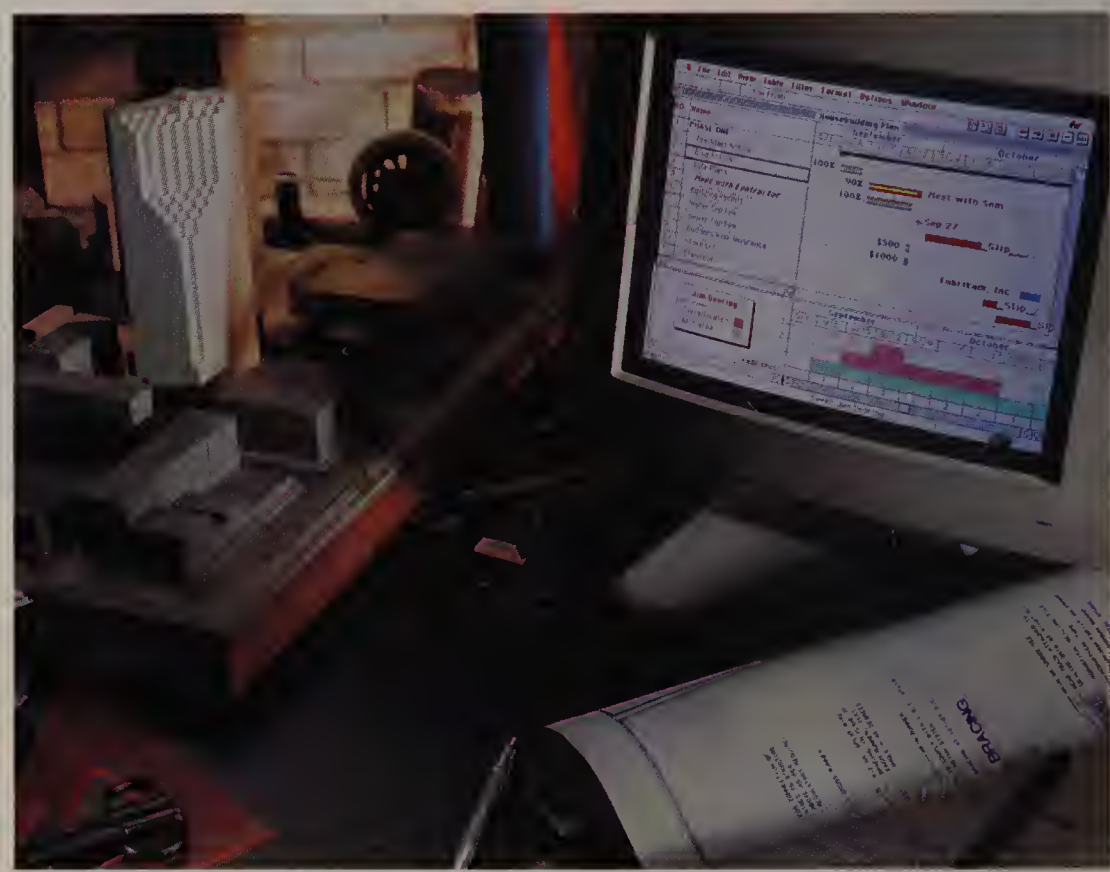
REVIEWS

Project-Management Software

MICROSOFT PROJECT 1.1

Pros: Easy to enter and update tasks from different project views; outliner creates levels of detail or consolidates information; custom views and reports; resource leveling across subprojects; can compare estimated costs and work against actual progress. **Cons:** Does not support AppleEvents or Publish and Subscribe; no links to Microsoft Schedule+. **Company:** Microsoft Corporation. **Requires:** Mac Plus; hard drive; System 6.0.4. **List price:** $695; License Pak $595.



JOHN WILLIAM LUND

Microsoft Project for the Mac may be new, but its ancestry extends back to Microsoft's DOS and Windows project managers. In fact, the product looks and works just like Project for Windows.

That's good news for professional planners. You get good scheduling flexibility and comprehensive reporting to handle large projects. But Project for the Mac includes a number of automated features that make project scheduling less perplexing for casual planners.

Outline Your Project

The Macintosh version of Microsoft Project lets you enter information in many ways. Some views take the form of an Excel-style table of activities or resources, others follow standard project-management conventions, such as the Gantt time line or PERT network.

The simplest approach to starting a project is to use the Gantt chart. You record a project's milestones using the attached outliner. After you enter your major headings, you can insert individual activities and estimate completion time. A bar representing the task's duration immediately appears. You can adjust task duration, modify dates, or update the percent complete—all interactively. A pop-up status box shows exactly how the task is changing; there is no need for you to enter figures in a data entry form or table.

Icons automate the entire process. For example, the promote or demote arrows move tasks or groups to the left and right in the outline structure. The edit link icon is the most interesting. Typically, connecting tasks is time-consuming and error prone, but Edit Link lets you schedule all designated activities, one after another, with one click.

The PERT chart window lets you view relationships as you enter tasks. You can then use the mouse to link, unlink, and rearrange nodes directly on the screen.

Sophisticated Planning, Too

But what about the times when your project does not fit a simple pattern? No problem. Project offers many split views—for example, the default Gantt Chart and Task Entry views. In addition to the information from the Gantt Chart, the task form includes task priority, date constraints (the activity has to start as soon as possible, say), and full- or part-time resources required to do the job. (While only 20 resources can be assigned to any one task, that number is probably adequate for most projects. Additionally, each project file can hold up to 2000 tasks and 2000 resources. On a 1MB Mac, 1000-task projects are the upper limit.)

Task links can be fine-tuned. For example, you can specify that several tasks must finish together, or you can build in delays or allow overlaps between tasks.

Finally, the task screen accepts subprojects. Subprojects are smaller,

complete projects that you have created before creating your master project. By linking subprojects you can manage larger jobs, yet keep the master project from becoming too unwieldy. But watch out for memory problems. If you do not have at least 1MB of RAM to keep subprojects open, detailed information does not pass between the master project and subprojects—only summary figures. However, with 4MB or more, you can open up to nine project windows. I use this feature to see all projects that share a common resource pool, or to jump between subprojects that feed the main schedule.

Project has several options for resources and schedules. The resource-allocation table and resource histogram pinpoint staff members who are scheduled for extra-long days. You can adjust work schedules—or have the program automatically level (smooth) assignments.

Using a split screen of the resource histogram and Gantt Chart helps immeasurably. All screens are dynamically linked. You can immediately see how moving a task bar eliminates a resource conflict, since the overload disappears from the histogram. While you don't get instant feedback during automatic leveling, you can view the changes, then revert to the original schedule if the new dates don't meet your expectations.

In some instances you will want to schedule overtime or adjust work hours. Project provides an overall project calendar, as well as calendars for resource groups and individual resources.

Personal Choices

Table after table of project dates and costs quickly lose focus. However, built-in filters let you search a project like a database. For example, you can view only the tasks assigned to a particular resource, over-budget items, or critical tasks. If the built-in choices don't meet your needs, you can create a custom filter that is automatically added to the menu.

In addition to 60 standard views, Project lets you create custom views, which you can use to record unique information such as purchase-order numbers or accounting codes. And, as with Excel, you can hide columns or change their width.

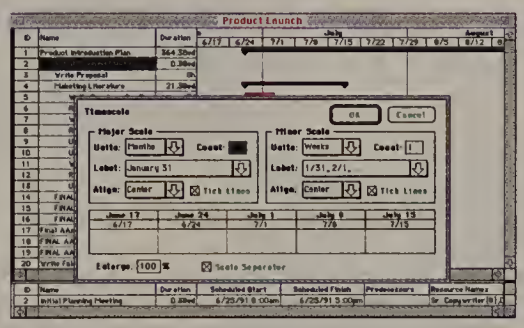
Reports take advantage of views you've built. After selecting one of five report types, you can specify the fields to be included in a report by choosing a table and applying the appropriate sorts and filters. You can also create new reports from scratch.

Formatting is another strong point. As expected, you control the style of text; and the progam lets you alter the appearance of task bars, milestones, and other objects, as well as change what data appears around tasks bars. The printouts are clear and professional.

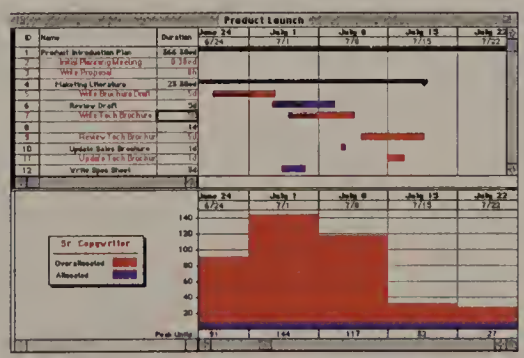
Reality Check

Jobs rarely go according to plan, so Project lets you save up to four reference (baseline) schedules. You can then spot bottlenecks by comparing actual work with the ideal schedule. There is a special Tracking Gantt Chart with two sets of bars: one shows the planned duration and the other illustrates the current schedule.

You can use the Edit Link command to record actual work. The Option Set Actual command automatically updates the schedule with the current date; this method assumes the schedule is on track.



Gantt Chart The Gantt time line shows task durations and highlights activities that are critical to the project. You can easily change dates by moving the task bars.



Resource Histogram Project graphs work loads, enabling you to pinpoint bottlenecks and slack time. The program can automatically smooth out work flow or you can manually change individual work assignments.

An important aspect of any project involves costs. Costs are based on resource use, either by hours worked or by a fixed fee. When you update the plan, Project calculates any variance from the plan, cost of work performed, and remaining costs. These figures are especially important for government contractors.

Unfortunately there is no way to assign costs other than resources to tasks, nor can you accommodate overhead, inflation factors, and other special costs.

File Exchange

Project files in the Macintosh version are interchangeable with Project for Windows files. This feature lets me use Macs and PCs linked through a server running Novell NetWare to bring consistency to planning done by different departments.

You can export data to Excel or other programs through the Clipboard or ASCII text options. To import data you must first create a custom table that matches the format of the incoming information.

Working with Microsoft Project does have its irritations, however. You cannot schedule part-time work nonuniformly, that is, have someone start at eight hours a day and reduce their hours over a task's duration. And the outline codes, known as Work Breakdown Structure, don't permit specific departments or jobs to be summarized on the Gantt. These functions, and more-accurate scheduling features, are available with Scitor's Project Scheduler 4.

According to Claris, the updated version of MacProject II will include automated links to Claris's Resolve spreadsheet for cost graphs, tables, and customized reports—capabilities not currently available with Microsoft Project and Excel.

On balance, though, I think Project does a good job of combining advanced planning techniques with easy operation. While other packages do more in specific instances, Microsoft Project can adeptly handle most mainstream planning needs.

—Mike Heck

See **Where to Buy** *for contact information.*

Page-Layout Software

DESIGNSTUDIO 2.0

Pros: Nonrectangular text and picture boxes; can rotate in 1/10-degree increments; text and graphics glossaries; row-and-column grid creator; adjustable arrowheads; smart quotes while typing; color separator. **Cons:** Hyphenation and justification apply to whole document only; mediocre spelling checker; unwieldy styles; requires lots of memory for complex documents. **Company:** Letraset USA. **Requires:** Mac Plus; 2MB of RAM; Mac II for color-separation "annex"; 40MB hard drive. **List price:** $795.

When Letraset came out with DesignStudio 1.0, a major upgrade of ReadySetGo, most people (including me) thought that it was too little and too late to compete with PageMaker 4.0 or especially with the power-packed QuarkXPress 3.0.

Naturally, any new version shares features with its predecessor, but DesignStudio 2.0 is awfully similar to 1.0. The new version comes with the same documentation, plus a 12-page addendum on new features, and another manual for the DesignStudio color separator. In addition to new color-separation features, the new DesignStudio provides an easy-to-use installer, horizontal scaling of type in 1 percent increments from 25 to 250 percent, the ability to select objects that are behind other objects by ⌘-clicking, automatic creation of smart quotes while you type, and a few other odds and ends—not much for a major upgrade.

Interface

DesignStudio 2.0 offers most of the interface features made popular by Aldus PageMaker—a pasteboard (which can be up to 99 by 99 inches) underneath the page; a grabber hand for moving the page around; ⌘-click zooming; drag-out ruler guides; an adjustable ruler zero point; and the ability to see an object while you move it, instead of seeing only its bounding box (QuarkXPress is finally getting this feature in version 3.1). There's also a great row-and-column grid creator.

You still have to go through a five-step process to put text or graphics on the page, however. You must select the text-box or picture-box tool, draw a box, select the text- or picture-contents tool, click in the box, then import the text or graphic. Even QuarkXPress makes this easier.

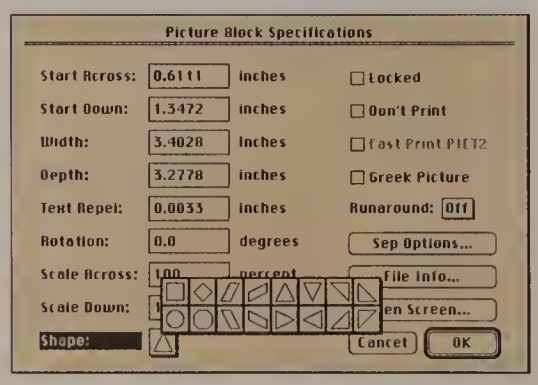
You can now position page elements either manually or numerically; there's alignment, grouping (but not across spreads), and step-and-repeat duplication. Also new are object-locking, nonprinting, or in the case of text boxes, the ability to set the text to pass through to the printer as PostScript.

Perhaps the best thing about DesignStudio is that, in addition to providing the basic shape tools (for creating lines, boxes, and ovals), it enables you to create nonrectangular picture and text boxes, so text flows or a graphic is cropped within that shape. With graphics, that has been virtually impossible except with FreeHand, Illustrator, or Photoshop.

Any object, including text and picture boxes, can have separate attributes for line width, line color, and pattern (there are a few dashed patterns); arrowhead shape (ingeniously adjustable); and fill color and pattern. Percentage tints are limited to 10-percent increments—better than PageMaker, worse than QuarkXPress. You can store text and graphics in DesignStudio's glossaries, a nice feature from the word processor world.

Setting Type

While DesignStudio's typesetting controls are good (with really great baseline shift control), they aren't up to the level of PageMaker's or QuarkXPress's. Both these programs let you set minimum, maximum, and optimum word-spacing and letterspacing values for any paragraph, while DesignStudio's controls—minimum and maximum only—apply to the whole document.



Setting Specs You can control page elements in DesignStudio very precisely using the object-specification dialog boxes. The pop-up menu shows the range of nonrectangular boxes available.

The program really falls down in its implementation of style sheets, however. Though you can apply styles to a character, word, or selection of text, in almost every other respect they're abysmal.

The text tools are equally disappointing. Find and Change are competent but not brilliant (you can search for and apply styles but no other attributes). And the spelling checker, left to itself, just jumps from unknown word to unknown word; you must press another key to get suggestions for correction (it often fails to offer a correction for simple typos such as *contstraint*).

DesignStudio's ability to rotate text and graphics in 1/10-degree increments is impressive, but not as impressive as QuarkXPress's, which even lets you edit text in its rotated position. (DesignStudio automatically rotates the text to horizontal for editing, then rotates it back when you're done.) Also, rotated objects cause DesignStudio to run out of memory, so to do complex work you need to have at least 5MB or 8MB of RAM and switch to black-and-white mode.

DesignStudio's new color capabilities are very good, but not as good as the capabilities of QuarkXPress or the PageMaker–Aldus PrePrint duo. DesignStudio has none of the great long-document tools (indexing, table-of-contents generation, multidocument printing) that are so well implemented in PageMaker. DesignStudio *annexes* allow developers to add features to the program, but there are many more QuarkXPress XTensions available. And finally, DesignStudio works only with PostScript printers.

Designing a Studio

If the documents you are creating are design-intensive and require the complex layout capabilities of DesignStudio, you can get almost all you need and more in QuarkXPress. For the nonrectangular picture boxes, you

(continues)

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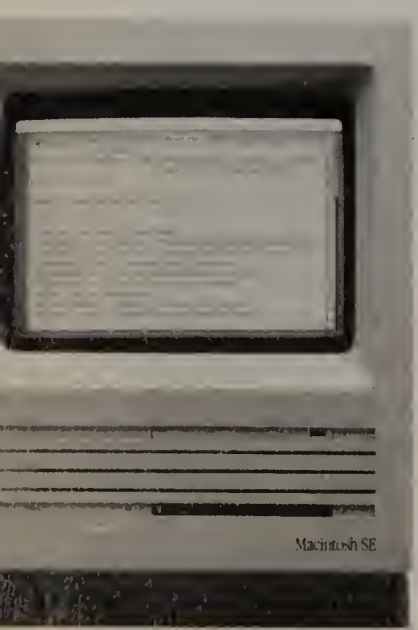

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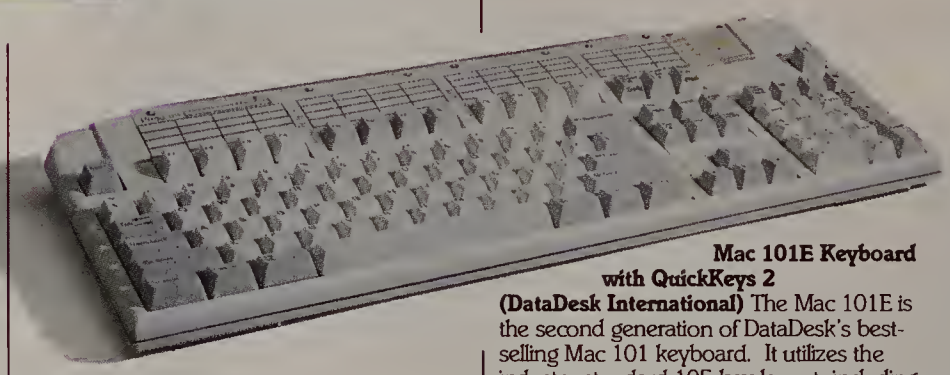

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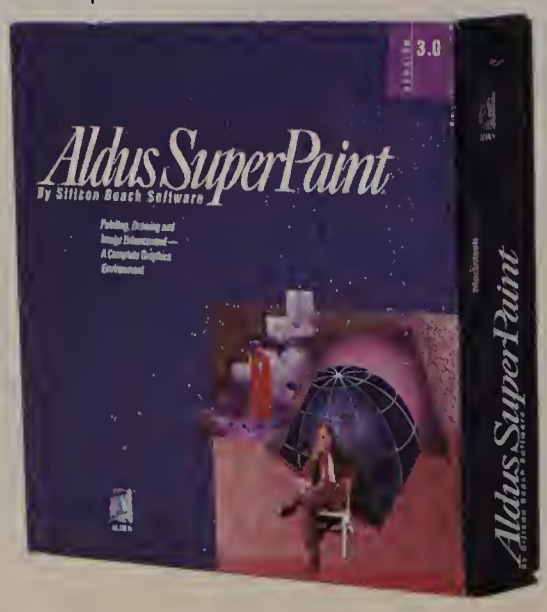

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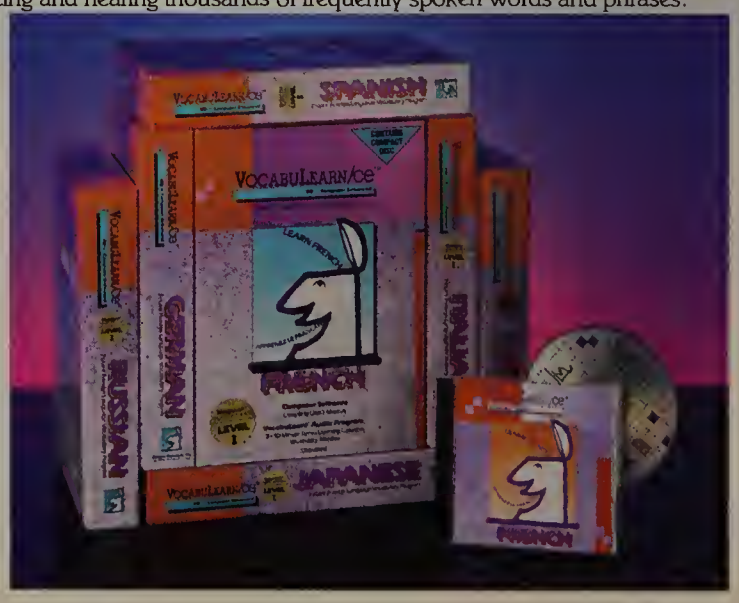

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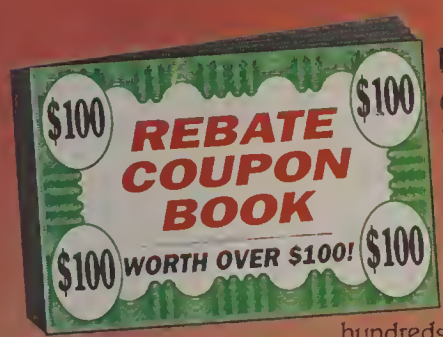

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❼STA0018 KaleidaGraph 2.1 ..... 150.
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EDU0279 Vocabulearn/CE French Level 1 (Audio CD) 69.
EDU0280 Vocabulearn/CE Spanish Level 1 (Audio CD)69.
Quantum Leap
CDR0026 CD7 SuperLibrary ..... 49.
CDR0024 GigiROM: Archival Library ..... 109.
CDR0025 MacAdemic: Educational Library ..... 79.
Wayzata Technology
EDU0194 The World Fact Book ..... 79.

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Caravelle Networks Corporation
❼NET0099 Mac to Mac - 5 pack ..... 165.
❼NET0100 Mac to Mac - 10 pack ..... 229.
CE Software
❼COM0054 In/Out (5 user Pak) ..... 128.
❼COM0041 QuickMail 2.2 (1 - 10 users) ..... 315.
CompuServe
❼COM0085 Membership Kit For the Macintosh ..... 22.
COM0040 Navigator 3.0 ..... 49.
DataViz
❼COM0001 MacLink Plus / PC 5.0 ..... 129.
❼COM0052 MacLink Plus / Translators 5.0 ..... 109.
Dayna Communications, Inc.
UTI0116 DOS Mounter 2.0 ..... 55.
NET0125 DaynaPort E/Z ..... 279.
Farallon™ Computing
COM0078 Liaison 3.0 ..... 279.
NET0005 PhoneNET® 128/512 ..... 31.
NET0084 PhoneNET® Manager's Pack ..... 669.
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NET0019 PhoneNET StarController® ..... 899.
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❼NET0122 Timbuktu® 4.0 ..... 136.
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NET0090 Nubus 10-pack ..... 2499.
NET0091 SE/30 ..... 299.
FreeSoft
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Hayes
❼COM0015 Smartcom II 3.2 ..... 84.
Insignia
❼UTI0174 AccessPC ..... 65.
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❼COM0045 SoftPC 1.3 ..... 245.
❼COM0091 SoftPC 2.0 for Mac Classic & LC ..... 139.
International Business Software
NET0129 DataClub Single ..... 119.
NET0097 DataClub - 3 Pack ..... 207.
NET0098 DataClub - 10 Pack ..... 539.
Microcom
❼NET0131 Carbon Copy Mac 2.0 Single ..... 59.
❼NET0132 Carbon Copy Mac 2.0 Unlimited ..... 179.
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COM0056 Prodigy Starter Kit for the Mac ..... 27.
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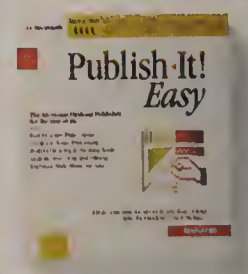

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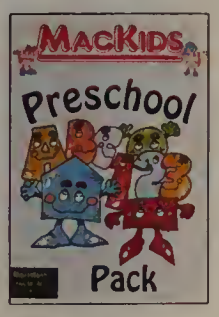

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Synergy
❼COM0003 Versa Term Pro 3.5 ..... 177.
Technology Works
❼NET0133 GraceLAN 50-User 2.0 ..... 319.
White Pine Software
DRI0244 Mac 220: VT 220 Emulator ..... 89.
DRI0245 Mac 240: VT240 Emulator ..... 139.
DRI0246 Mac 241: VT241 Emulator ..... 225.

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DTP0045 PageMaker 4.01 ..... 499.
DTP0040 Personal Press ..... 199.
DTP0047 PrePrint ..... 329.
Letraset
FON0086 LetraStudio ..... 275.
Postcraft
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Quark, Inc.
DTP0049 XPress 3.0 ..... 519.
TimeWorks
DTP0048 Publish It! Easy with File IT! 2.1 ..... 139.

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❼GRA0251 ColorSnap 32 Plus ..... 649.
Dayna Communications, Inc.
DRI0174 DaynaFile dual 360K (5.25) & 1.44 (3.5) 739.
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PowerUser™
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❼DRI0326 105 Meg External Hard Drive ..... 499.

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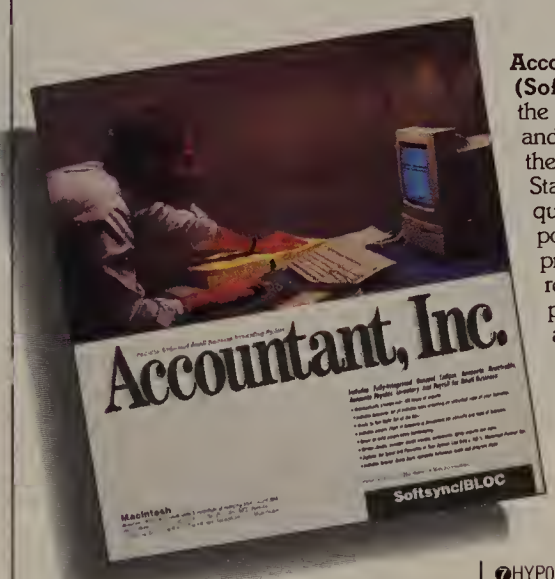
Beacon Technology, Inc.
❼HYP0034 HyperBible International Version 2.0 .... 125.



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❼DRI0375 Infinity 88 Removeable Single ..... 1199.

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❼ENT0381 The Oregon Trail ..... 29.
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MicroMaps
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EDU0277 Converting to System 7-part 1 ..... 52.
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Voice & Video
Getting Started Video: Excel 2.2, PageMaker 4.0, Word 4.0 ..... ea. 55.
Advanced Techniques Video: Excel 2.2, PageMaker 4.0, Word 4.0 ..... ea. 55.
EDU0063 HyperCard Getting Started Video ..... 55.
Zondervan Publishing House
❼BOK0021 MacBible - King James Version ..... 79.
❼BOK0020 MacBible - New International Version .... 79.

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Broderbund
ENT0259 Shufflepuck Cafe ..... 25.
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ENT0321 Earl Weaver Baseball ..... 32.
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ENT0382 PGA Tour ..... 39.
Sir Tech Software, Inc.
ENT0346 Bane of the Cosmic Forge ..... 35.
ENT0347 Wizardry II: Knight of Diamonds ..... 29.
Spectrum HoloByte
FACES, TETRIS, Welltris ..... ea. 25.
The Software Toolworks
ENT0281 Chessmaster 2100 ..... 32.
ENT0269 The Hunt For Red October ..... 20.
Three-Sixty
ENT0323 Sands of Fire ..... 32.
XOR Corporation
ENT0274 MacGolf Classic ..... 52.

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Adobe Systems, Inc.
❼DAC0028 Adobe TypeAlign ..... 65.
❼FDN0264 Adobe Type Manager 2.0 ..... 59.
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❼UTI0224 EPS Exchange ..... 89.
❼FON0014 Fontographer 3.3 ..... 269.
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❼FON0361 FontMonger ..... 65.
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GRA0156 TypeStyler ..... 115.
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INP0153 Pacific MacPage ..... 529.
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❼FON0410 FontCard NTX ..... 469.
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❼FON0343 T-Script 3.0 ..... 92.
❼FON0357 T-Script Basic ..... 55.

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❼GRA0257 Images with Impact! People 1 ..... 95.
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CAD0033 Design Your Dwn Home-Interiors ..... 65.
Adobe Systems, Inc.
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❼GRA0125 Streamline 2.0 ..... 122.
❼GRA0191 PhotoShop 2.0 ..... 549.
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❼GRA0280 Canvas 3.0 ..... 279.
GRA0187 UltraPaint ..... 125.
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❼GRA0106 Studio/8 2.0 ..... 189.
❼GRA0231 Studio/32 ..... 449.
Farallon™ Computing
GRA0221 MediaTracks™ ..... 219.
GRA0222 MediaTracks™ Multimedia Pack ..... 369.
Graphsoft
❼CAD0024 Blueprint 2.1 ..... 219.
❼CAD0030 MiniCAD+ 3.0 ..... 595.
Innovative Data Design
❼GRA0104 Dreams 1.1 ..... 419.
❼CAD0039 MacDraft 2.1 ..... 279.
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❼GRA0151 ColorStudio ..... 599.
DTP0019 ImageStudio 1.5 ..... 139.
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❼GRA0273 MacroMind Director 3.0 ..... 739.
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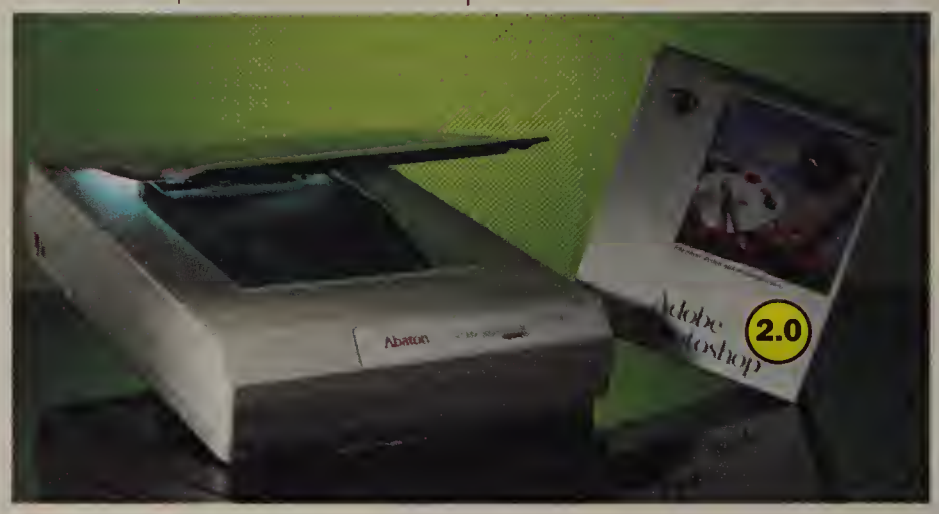
GRA0277 Metro-ImageBasics ... . 35.
❼GRA0169 Newsletter Maker ..... 85.
Paracomp
GRA0235 FilmMaker ..... 435.
❼GRA0286 Magic ..... 259.



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❼GRA0112 SuperPaint 3.0 ..... 135.
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GRA0239 Master Color ..... 99.
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Bright Star Tech, Inc.
❼GRA0161 interFACE ..... 249.
CE Software
GRA0070 CalendarMaker 3.0 ..... 31.
Claris
❼CAD0029 ClarisCAD 2.0 ..... 645.
❼GRA0271 MacDraw Pro ..... 285.
❼GRA0117 MacPaint 2.0 ..... 89.
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GRA0240 Easy Color Paint 2.0 ..... 47.
Dream Maker
❼GRA0105 Cliptures Vol. 1 Business Images ..... 69.
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❼GRA0233 Swivel 3D Professional ..... . 435.
❼GRA0234 SwivelArt ..... 81.
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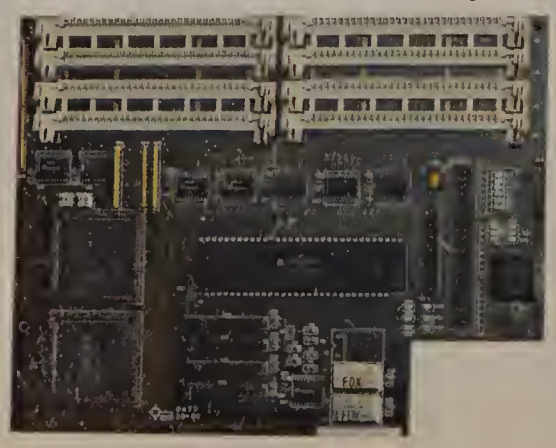

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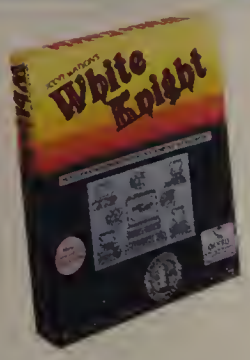

White Knight V.11
❼The perfect low-cost solution to almost any Mac User's telecommunication needs. Offers the kind of power associated with products costing hundreds of dollars more. Winner of 11 awards including MacWorld's World Class Software Award. **COM0060 $85.**

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Strategic Mapping, Inc.
GRA0227 Atlas MapMaker 4.5 ..... 459.
SuperMac
❼GRA0253 PixelPaint 2.1 ..... 159.
❼GRA0249 PixelPaint Professional 2.0 ..... 499.
T/Maker Co.
GRA0039 ClickArt Business Image ..... 32.
GRA0272 ClickArt Color Graphics for Presentations 99.
GRA0088 ClickArt EPS Illustrations ..... 82.
GRA0270 ClickArt-Events and Holidays ..... 32.
Virtus
GRA0278 Virtus WalkThrough ..... 259.
Zedcor
❼GRA0199 DeskPaint & DeskDraw 3.03 ..... 113.

INP0183 Mac 101E Keyboard w/Quickeys 2 ..... 149.
Digital Vision, Inc.
GRA0145 Computer Eyes B & W ..... 199.
❼GRA0154 Computer Eyes For Mac-Color ..... 349.
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INP0095 Graflex ..... 82.
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INP0060 Turbo Mouse ADB (SE or II) ..... 109.
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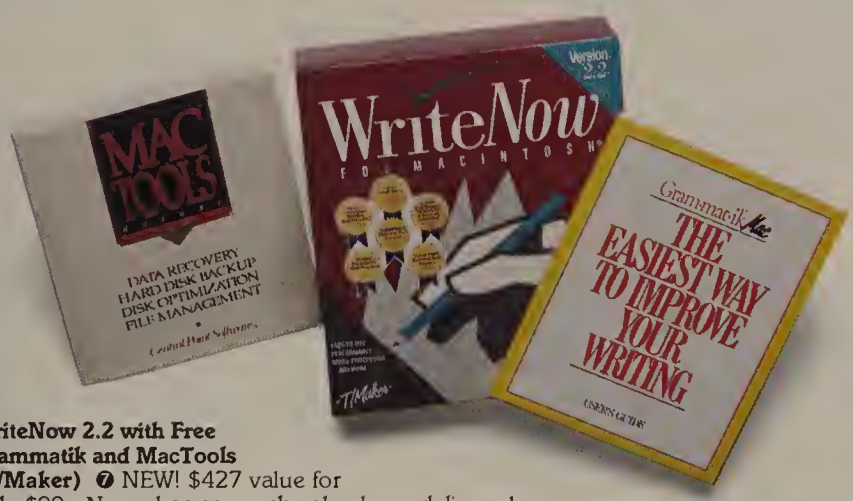
❼INP0156 Mac Pro Plus ..... 145.
❼INP0192 Mac Trak Pro ..... 219.
Koala
INP0127 MacVision 3.0 ..... 269.



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(T/Maker) ❼ NEW! $427 value for only $99. Never has so much value been delivered at such a low price. WriteNow, two-time winner of the prestigious MacUser Eddy award for word processing, now comes with a FREE full version of Grammatik Mac 2.0, the best selling Grammar/style checker and a full version of MacTools Deluxe, the data protection and file management utility. WriteNow, containing a 1.4 million word thesaurus and 135,000 word dictionary is still the fastest and easiest word processor for the Mac and is MS Word and System 7 compatible! **WRD0018 $99.**

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DRI0185 Virtual 2.0 PMMU ..... 188.
DayStar Digital
❼DRI0224 64K FastCache IIci ..... 279.
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❼DRI0416 RAM PowerCard ..... 749.
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❼DRI0197 MaraThon 030 - (Mac Plus) ..... 399.
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❼DRI0151 MaraThon 030-SE/030 ..... 599.
❼DRI0380 Marathon Racer For Mac II ..... 1079.
❼DRI0378 Marathon Racer For Mac Plus ..... 599.
❼DRI0379 Marathon Racer For Mac SE ..... 599.
Impaq
CHP0043 512K Video SIMM Upgrade ..... 149.
Micron Technology
❼DRI0321 PicturePress Card (Xceed ICDP-II) ..... 745.

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❼INP0091 LabelWriter ..... 185.
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INP0167 Epson EPL-7500 Laser Printer ..... 2599.
INP0173 Epson PostScript Kit ..... 1599.
Seikosha
INP0041 Seikosha SP 2000 AP Printer ..... 235.
Sharp
COMP007 Wizard OZ 7000 (32KRam) ..... 229.
COMP018 Wizard OZ 7200 (64KRam) ..... 255.
COMP019 Wizard Oz 8000 (64KRam) ..... 329.
COMP023 Wizard Oz 8200 (128KRam) ..... 399.
ThunderWare
INP0116 LightningScan 400 ..... 385.
INP0189 LightningScan Pro 256 ..... 539.
❼INP0007 ThunderScan Plus ..... 199.

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INP0164 LaserScript Printer LX 1729
Articulate Systems
❼INP0160 Voice Navigator II ..... 559.
CH Products
INP0121 RollerMouse ADB ..... 75.
Datadesk International
INP0174 Mac101E Keyboard 129

Microspeed
INP0126 MacTRAC ADB ..... 75.
INP0140 MacTRAC DB9 ..... 62.
Microtek
❼INP0180 Microtek ScanMaker 600ZS ..... 1599.
❼INP0176 ScanMaker 1850S ..... 2369.
❼INP0162 TrueLaser Printer ..... 2019.
MicroTouch
❼INP0084 The UnMouse ..... 159.
Mouse Systems
❼INP0132 Little Mouse ADB ..... 74.
❼INP0134 Trackball / ADB ..... 69.

FolderBolt
(Kent Marsh) "If you work in a shared environment, but don't want to share everything on your Macintosh, you may want a copy of Folder Bolt...FolderBolt is a welcome addition to the Security Arsenal." MacWeek June 25, 1991. Create completely locked folders, read-only folders, or password protected drop box folders. No one without the password can open, duplicate, delete, or move them. FolderBolt can unlock all your folders at once and re-lock them on shutdown. Also generates a complete audit trail of all activities. **UTI0212 $79.**

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Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

DayStar's RAM PowerCard
(DayStar) ❼ The RAM PowerCard™ is the ultimate drive for power users who need lightning fast hard drive response, It uses fast RAM and connects directly into a NuBus slot. The RAM PowerCard bypasses the slow Apple SCSI port to achieve data transfer rates approaching 8 MB per second. Using low-cost Mac II SIMMs, the RAM PowerCard makes NuBus RAM useful and affordable. Up to 16 SIMMs (100 ns or faster) can be installed. **DRI0416 $749.**

MicroTech International, Inc.
CHP0025 Mac Classic 1 Meg Upgrade ..... 79.
CHP0026 Mac Classic 3 Meg Upgrade ..... 179.
DRI0315 Mac Classic Upgrade Kit 20-1 ..... 399.
DRI0317 Mac Classic Upgrade Kit 40-1 ..... 499.
DRI0318 Mac Classic Upgrade Kit 40-3 ..... 575.
Newlife
❼DRI0419 Accelerator Classic 20MHz 68030 ..... 499.
❼DRI0420 Accelerator Classic 20MHz 68030/68882 .... 569.
❼DRI0417 Accelerator SE/Plus 16 MHz 68030 ..... 499.
❼DRI0418 Accelerator SE/Plus 16 MHz 68030/68882 .. 599.
PowerUser™
❼CHP0013 1 Meg Simm 100ns PowerUser ..... 59.
Total Systems
Gemini & Gemini Classic (Full line available)
❼DRI0301 Gemini 20 MHZ Card ..... 819.
❼DRI0302 Gemini 25 MHZ Card ..... 1135.
❼DRI0360 Gemini Classic 20MHz 68030 ..... 979.
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❼DRI0362 Gemini Classic 25MHz 68030 ..... 1229.
❼DRI0364 Gemini CLassic 33MHz 68030 ..... 1499.
❼DRI0265 Gemini Plus Kit ..... 129.
❼DRI0295 Mercury 16MHz 68030 - Plus ..... 499.
❼DRI0297 Mercury 16MHz 68030 - SE ..... 365.
❼DRI0299 Mercury SCSI Module - Plus ..... 209.

MODEMS & FAX

Abaton
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MOD0034 InterFax 24/96 ..... 339.
Applied Engineering
❼MOD0054 DataLink/Mac ..... 209.
Best Data
MOD0021 SmartOne 2400/1200 ..... 139.
Dove
❼MOD0038 DoveFax Desktop ..... 299.
❼MOD0053 Dove Fax Plus ..... 359.
Global Village
❼MDD0049 TelePort 2400 ADB Modem ..... 139.
❼MOD0058 TelePort/Fax 9600 ..... 185.
Hayes
COM0023 Smartmodem 2400 ..... 349.
MOD0017 Smartmodem 9600 (V series) ..... 589.
MOD0060 Personal Modem 2400 w/Smartcom ..... 149.
MOD0065 Bundle V-Series Ultra SmartModem 9600 ... 829.
PowerUser™
MOD0062 24/96 Mini Send/Receive Fax Modem .. 199.
MOD0043 2400 BPS Mini Modem ..... 99.
MDD0047 Mini Send Fax 2400/9600 ..... 149.
Prometheus
❼MOD0052 9600M Plus Modem ..... 599.
MDD0068 ProModem 2400 Mini Plus ..... 169.
❼MOD0046 ProModem 24/96 MSR ..... 299.
❼MOD0064 ProModem Ultima ..... 699.
❼MDD0035 TravelModem ..... 199.
Shiva
❼NET0067 NetModem V.32 (9600) ..... 1169.
Supra Corporation
❼MOD0020 SupraModem 2400 ..... 119.

Meeting Maker
(ON Technology, Inc.) A Macintosh network application that helps you plan, schedule and confirm meetings. You can schedule a time and date, select required guests, reserve rooms and resources and prepare agendas. Meeting Maker also has a personal calendar that allows you to block out activities, meetings, private work sessions, even recurring weekly or monthly appointments in a single step. You can also print your calendar in popular day-planner formats. **BUS0165 $309.**

Electronic Arts
MUS0004 Deluxe Music Construction 2.5 ..... 85.
Farallon™ Computing
MUS0036 MacRecorder® 2.0 ..... 174.
Opcode Systems
MUS0083 MIDI Translator ..... 43.
Repertoire
MUS0034 Music Publisher 2.5 ..... 359.

SECURITY & VIRUS PROTECTION

ASD Software, Inc.
❼UTI0135 FileGuard 2.7 ..... 139.
❼UTI0130 FileGuard 2.7 - Dffice Pack 5 ..... 499.
❼UTI0131 FileGuard 2.7 - Office Pack 10 ..... 799.
❼ACC0539 MaccessCard Reader ..... 299.
Fifth Generation System
❼UTI0120 DiskLock ..... 118.
Kensington
ACC0235 Apple Security Kit ..... 34.
PassProof ..... ea 69.
Kent Marsh
❼UTI0212 FolderBolt ..... 79.
❼UTI0028 MacSafe II ..... 107.
❼UTI0064 NightWatch 1.03 ..... 86.
Microcom
❼UTI0093 Virex ..... 59.
❼UTI0150 Virex 10-pack ..... 429.
Symantec Corporation
❼UTI0214 Symantec Antivirus for Mac 3.0 (SAM) .. 65.

UTILITIES & PROGRAMMING

Abbott Systems, Inc.
❼UTI0236 Calc+ ..... 39.
❼UTI0113 CanDpener ..... 62.
Advanced Software
❼UTI0192 Intouch ..... 39.
Aladdin Systems
❼UTI0145 StuffIt Deluxe 2.0 ..... 62.
ALSoft
❼UTI0132 DiskExpress II 2.07 ..... 55.
UTI0110 MasterJuggler 1.5 ..... 55.
Baseline Publishing
UTI0182 Exposure Pro ..... 78.
❼UTI0238 Init Info Pro ..... 39.
❼UTI0187 INIT Manager ..... 34.
❼UTI0190 Personality ..... 49.
UTI0183 ScreenShot ..... 34.
Berkeley System Design
❼UTI0119 After Dark 2.0 ..... 29.
❼UTI0230 More After Dark ..... 25.
❼UTI0231 More After Dark/ After Dark 2.0 Bundle .. 45.
❼UTI0074 Stepping Out II 2.02 ..... 55.
CE Software
❼UTI0188 Quickeys 2 v.2 ..... 94.

Retrospect 1.3 & Retrospect Remote
(Dantz Development)
❼ Schedule automatic, unattended backup to any tape, optical or cartridge drive with Retrospect's calendar launch features. Liberate valuable hard disk space by archiving inactive files until needed. For the network manager, Retrospect Remote backs up an entire network of Macintoshes to a single storage device, without remote user interface. Security is maintained by extensive password protection and optional data encryption. Add remote 10-Packs or Remote 50-Packs to support additional users. Compatible with both Systems 6 and 7, Retrospect lets you keep your data safe while making the transition. **Retrospect 1.3 UTI0227 $159. Retrospect Remote UTI0196 $269. Retrospect Remote 10-Pack UTI0200 $148.**

MUSIC & SOUND

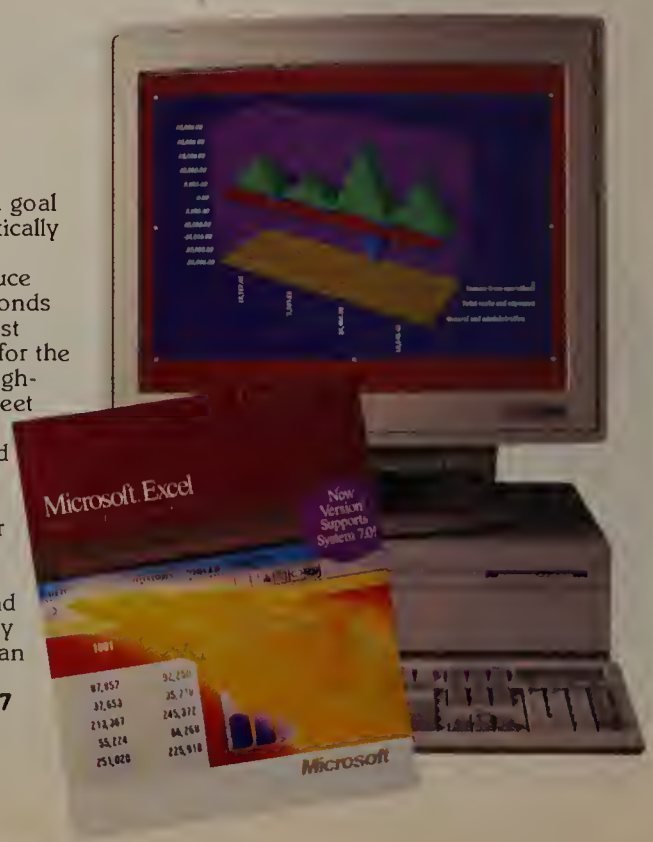
Coda Music Software
❼MUS0044Finale 2.6.1 ..... 549.

Screenshot
(Baseline) Makes capturing the image simple and easy. Hit the user-definable key combination and the CDEV pops up a menu to specify whether you want to print it or save it. It captures whole screen, windows, menus, or selected portions of the display. **UTI0183 $34.**

INIT Manager Determines which INIT is crashing your system. Works as a CDEV and as an application. When it finds problems, it disables the offending INITs so you can resolve the conflicts. **UTI0187 $34.**

INIT Info Pro
The most complete list of INIT and application conflicts in existence. Includes hundreds of pages of facts and provides HyperCard stacks which examine all the drives connected to your Mac and complies a report of the problems. **UTI0238 $39.**

Excel 3.0
(Microsoft) ❼ Perform goal seek analysis, automatically link and consolidate worksheets, and produce stunning output in seconds with Excel 3.0, the most powerful analytic tool for the Macintosh. Achieve high-performance spreadsheet capabilities along with charting, database, and custom development tools created for the novice and power user alike. Features unparalleled power, advanced analytical and charting tools, and easy database access all in an ideal development environment. **BUS0167 $309.**



CompuServe

You can now contact MacWAREHOUSE or place orders with us in the **Electronic Mall** on CompuServe. The **MacWAREHOUSE GO code GO-MW**. As always, you'll get fast, dependable overnight service and you can leave messages for Kerry or any of our support staff.

ColorStudio 1.5 With Shapes (Letraset) ❼ ColorStudio 1.5 With Shapes provides the tools you need to create ads, logos, package designs, brochures, and presentation graphics on your Mac, without pasteups and light tables. Its anti-aliasing ensures smooth output for both print and video. New features include a full CMYK viewing and editing mode and support for Photoshop-type and other third party plug-ins. Version 1.5 also includes ColorCalibrator, a utility for optimizing output, and colorTalk for creating your filters and effects. The shape extension turns type into graphic objects you can bend, stretch and paint. **GRA0151 $599.**

Connectix
UTI0148 Hand-Off II 1.1.3 ..... 56.
Custom Applications
❼UTI0136 Freedom of Press 3.0.1 ..... 255.
❼UTI0185 Freedom of Press Light 3.0.1 ..... 55.
Dantz Development
❼UTI0227 Retrospect 1.3 ..... 159.

DeltaGraph Professional (DeltaPoint) ❼ DeltaGraph Professional provides over 35 chart types. Advanced features include extensive formatting options, built-in custom chart templates, CMYK color, and System 7 compatibility. DeltaGraph Professional also offers text outlining, bullet charts and a built-in slide show feature. **BUS0187 $199.**

❼UTI0196 Retrospect Remote ..... 269.
❼UTI0200 Retrospect Remote 10-Pack 148
Dariana Software
❼UTI0218 MacSlueth ..... 89.
Dubl-Click
UTI0194 ClickChange ..... 59.
Fifth Generation Systems
❼UTI0063 FastBack II 2.5 ..... 125.
❼UTI0087 SuitCase II 1.2.1 ..... 49.
Insight Developement
❼UTI0098 MacPrinf 1.2 ..... 95.
Magic Software
❼UTI0077 Autosave It 2.0 ..... 26.
Microcom
❼UTI0191 911 ..... 89.
❼UTI0233 Citadel ..... 93.
❼UTI0140 Complete Undelete ..... 49.
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Now Software
❼UTI0167 Now Utilities 2.0 89
❼UTI0168 Screen Locker ..... 45.
ON Technology
UTI0142 ON Location ..... 75.
Salient
❼UTI0179 DiskDoubler 3.7 49
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UTI0207 Offline 2.0 ..... 65.
SuperMac
❼UTI0203 DiskFit 2.0 ..... 65.
Symantec Corporation
UTI0151 Norton Utilities for the Mac 85
UTI0078 Symantec Utilities for Mac II (SUM) ..... 96.
❼LNG0051 THINK C 5.0 199
❼LNG0002 THINK's Pascal 3.0 ..... 165.
Zedcor
❼LNG0031 ZBasic 5.0 ..... 99.

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❼UTI0100 OmniPage 2.1 ..... 495.
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❼WRD0026 MacWrite II ..... 139.
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❼WRD0032 TASTE ..... 97.
Deneba Software
SPL0015 Spelling Coach Pro. 3.1 ..... 124.
Microsoft
❼WRD0022 Word 4.0 ..... 245.
Nova Development
❼WRD0044 American Handbook ol Business Letters 32.
❼WRD0043 English Writing Guide ..... 39.
WRD0045 Instant Library of Quotations ..... 32.
Paragon
❼WRD0029 Nisus 3.05 ..... 245.
Petroglyph
WRD0046 Editorial Advisor ..... 79.
Reference Software
❼SPL0023 Grammatik Mac 2.0 ..... 59.
Sensible Software
SPL0018 Sensible Grammar ..... 51.
SNA, Inc.
WRD0033 Stylist ..... 51.
T/Maker Co.
❼WRD0018 WriteNow 2.2 w Grammalik/MacTools ..... 99.
WordPerfect
❼WRD0041 WordPerfect 2.0 ..... 279.
WordStar
SPL0028 Correct Grammar 2.0 ..... 55.

Calc+ (Abbott Systems) ❼ A next generation calculator, with powerful decimal and Desktop Publishing function. It's fast, easy to use and has all the features of a professional desktop calculator multiline resizable display, paper tape, fast operation from the Mac's numeric keypad or regular keyboard. It can also perform desktop publishing calculations in inches, centimeters, picas and ciceros and do instant conversions between any of these units. **UTI0236 $39.**

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STOP PRESS

Microsoft Project 1.1 (Microsoft) ❼ Pulls all the scattered information surrounding a project into one convenient place. A simple spreadsheet-like entry form helps start you with lists of people, resources, and deadlines. Modify plans while in progress. Update the schedules of an entire list of people. Prints out various charts for data manipulation. **BUS0181 $475.**

Microsoft Schedule+ 5 Pack
❼ Uses a standard calendar as an entry and display form to show you when people are available. Select a time and Schedule+ will book the meeting on your calendar and notify everyone else via MS Mail. Confirms when each participant accepts. Prints calendars in notebook sizes, and has alarms to remind you of scheduled events. **BUS0186 $129.**

A great, new graphics and animation program designed for the novice and corporate user.

Paracomp Magic (Paracomp) ❼ The newest addition of presentation programs for the corporate user. Facilitates the quick assembly of graphics and sound and brings powerful animation and presentation capabilities to the novice and corporate user. Designed to eliminate the normal learning curve associated with other graphic presentation programs and still provide sophisticated animation effects and multimedia capabilities. Incorporates graphic creation, animation techniques, text, sound and more. **GRA0286 $259.**

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would need to use FreeHand or Illustrator and import the resulting graphic. If you work with less complicated documents but need long-document prowess, choose PageMaker. If you work with both long and complicated documents, buy PageMaker and DesignStudio. But don't build your studio around DesignStudio. **—Steve Roth**

See **Where to Buy** *for contact information.*

IBM PC AT Emulation

EGA/AT OPTION MODULE

Pros: Thorough implementation; expanded memory and coprocessor support. **Cons:** Needs 4MB of RAM to run; no automatic disk format. **Company:** Insignia Solutions. **Requires:** Mac SE/30 or Mac II; System 6.0; 4MB of RAM; hard drive; SoftPC 1.3. Recommended: Coprocessor; DOS-compatible floppy disk drive. **List price:** $199; SoftPC 1.3 $399.

SOFTPC FOR THE CLASSIC/LC 2.0

Pros: Low memory requirements; good performance; excellent price. **Cons:** Very slow on a Mac Classic; no coprocessor support. **Company:** Insignia Solutions. **Requires:** a compact Mac, LC, or Mac Portable; System 6.0; 2MB of RAM; hard drive. Recommended: SuperDrive or DOS-compatible floppy disk drive for the Mac. **List price:** $199.95.

Some might say it's contrary to evolution, others that it's survival of the fittest, but the fact is the barriers between Macs and PCs are breaking down. With some 50,000 programs in the PC universe—many of them written only for DOS and many of them written to accomplish specific tasks—it's no wonder some Macintosh users need a PC.

Insignia Solutions' SoftPC puts a PC on a Mac screen. The SoftPC EGA/AT Option Module, an upgrade to SoftPC 1.3 for the SE/30 and Mac II family, and SoftPC for the Classic/LC for use with the LC, the Portable, and the other compact Macs, give you AT function at a bargain price. All you need is enough space on a hard drive and a floppy disk drive that can handle DOS format. (SuperDrives—which can read DOS floppy disks—are included in all new Macs; Mac Pluses, Mac II's, and older SEs lack this high-density disk drive.)

SoftPC is a graceful implementation of the PC architecture on the Mac. With no DIP switches to worry about, SoftPC emulates IBM PC AT hardware—motherboard, controller boards, serial board, and the like—completely in software through a powerful BIOS that remaps Intel 80286 addresses to a Motorola 680X0. (A BIOS serves as the interface between PC system software and hardware.) DOS runs on top of this BIOS.

SoftPC ships with DOS 3.3 as well as GW BASIC, but any operating system that runs on an AT will work. You really don't have to give DOS a second thought. In less than four minutes, the SoftPC installer puts all the right files in the right places. You only need to know a few commands to get around, and the manual covers the commands clearly and concisely.

Because SoftPC is entirely software, you have a lot of flexibility with peripheral hardware. SoftPC lets you change fixed hard drives through options on the menu bar instead of making you open the computer case. You can also change video boards and serial output, add a coprocessor, add a mouse, and add expanded memory through SoftPC software without touching a screwdriver. The EGA/AT Option Module for the Mac II family supports expanded memory or a coprocessor; however, many programs don't take advantage of these extensions. Each time you make a hardware change, you need to reset SoftPC—an operation that restarts your environment—but it is a small price to pay for simplicity.

SoftPC gives you access to two fixed drives, C: and D:, at any one time. Each drive is actually a file on the Mac hard drive. These virtual hard drives are treated like real hard drives. Insignia has conformed SoftPC so closely to IBM architecture that it is even necessary to prepare and format these virtual hard drives with FDISK and FORMAT commands. An automatic formatting option for those less familiar with DOS would be useful. Hard drives can be as small as 1MB or as large as 30MB, limited only by the existing space on the Macintosh hard drive. You create and change hard drives in two SoftPC dialog boxes.

Network drives are not files, they are folders on the Macintosh hard drive. Through a little byte magic, SoftPC stores and retrieves files from the Macintosh as if they were PC files on a network hard drive. This means that SoftPC can transparently transfer files back and forth between the PC hard drives and the Macintosh.

SoftPC's major drawback is its speed. Comparisons using an array of benchmarks and popular applications show that on a Macintosh IIcx, SoftPC performs at about 40 percent of the speed of a true-blue PC AT running at 8MHz. Remarkably, SoftPC for the Classic/LC runs at the same speed on a Macintosh LC despite its smaller memory requirement. (The Classic/LC version requires only 2000K of RAM compared with 3050K of RAM needed for SoftPC EGA/AT for the Mac II family.) On a Macintosh Classic, performance is slightly better than that of an IBM PC XT. Only on a IIfx does SoftPC achieve better-than-AT speeds.

Insignia has done a great job optimizing access times, but has been unable to provide video fast enough for graphics-intensive programs like Microsoft Windows, Software Publishing Corporation's Harvard Graphics, or the hundreds of games for PCs; even paging through a large spreadsheet can be tiresome. Insignia also did an excellent job handling keyboard mapping, documentation, and PostScript pass-through—for PC applications that provide PostScript output.

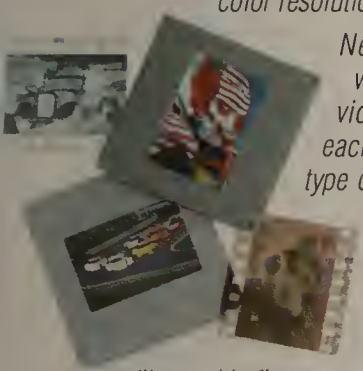
SoftPC works, and works very well, but so what? SoftPC's distinct advantage is its price. At $199 for the EGA/AT Option Module and $199.95 for SoftPC for the Classic/LC (SoftPC 1.3 retails for $399), it is by far the cheapest clone out there with the greatest potential for expansibility and the lowest possibility of breakdown. SoftPC is not for everyone, but for Mac owners who need affordable and complete PC function, SoftPC is an excellent value.**—Tim Warner**

See **Where to Buy** *for contact information.*

New FROM NIKON

When we introduced our first desktop scanner, we set a standard by which all others are judged. Now, with the new Nikon LS-3510AF, we've managed to set an even higher standard by bringing you a better, faster 35mm scanner. For less.

Better control. First we improved color scanning capability. The new LS-3510AF offers you the option of either standard 8-bit or true 12-bit scanning for even greater color resolution.



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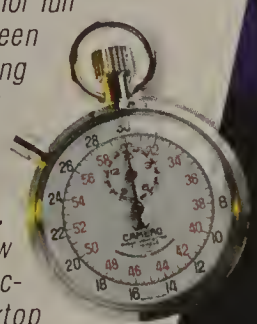

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Circle 67 on reader service card

Laser Printer

BLP ELITE

Pros: Inexpensive Adobe PostScript printer. **Cons:** Limited fonts in ROM. **Company:** GCC Technologies. **List price:** $1599.

In the past, printers with Adobe PostScript afforded high quality at equally high prices. With the GCC Technologies BLP Elite printer you get the same high quality, for a full thousand dollars less than the comparable Apple Personal LaserWriter NT. To keep the price low, GCC eliminated some features and limited the number of built-in fonts. The BLP Elite isn't a stripped-down unit; it's a strong contender in the laser wars.

Under the Hood

The printer is amazingly light—about 25 pounds—which I appreciated while carrying it up the stairs to my office. Setup took about 10 minutes and was easy. The documentation is excellent, with lots of diagrams, well-written instructions, and a good index. You connect the printer to the Mac via LocalTalk connectors for a shared setup, or with an RS-232 serial cable for an IBM-compatible.

Inside the printer is a 16MHz Motorola 68000 chip, running an Adobe PostScript interpreter. The version of PostScript used, 52.3, includes the Adobe Type Manager rasterizing features, which improve type-rendering speeds. The BLP Elite is based on a 300-dots-per-inch, 4-pages-per-minute Oki Electric print engine. The Oki engine allows print to extend to the left, right, and bottom edges of the page, and with only a ¼-inch top margin. In contrast, the Canon LX engine used in the Personal LaserWriter NT leaves a ½-inch margin on all sides of the page. The Oki engine also has a sleep mode, which switches the printer into a silent standby condition. The supplied letter-size paper tray holds 200 sheets; legal-size, envelope, and A4 paper trays are available as optional extras. Normally, paper enters the printer through the front paper tray and exits onto the top of the unit. You can manually feed single sheets into the front; a panel on the back of the printer flips open, allowing a straight-through paper path.

The BLP Elite uses a slightly modified version of Apple's LaserWriter 7.0 printer driver. The modifications allow the driver to take advantage of the printer's edge-to-edge print capability. The printer ships with QuickEnvelope, an envelope-printing utility. It's a no-frills utility but works fine for casual envelope printing. GCC also provides Apple's font-downloading utility and a set of printer-description files for use with applications like PageMaker.

I appreciated the BLP Elite's front-panel LCD, which displays useful information in plain English. The printer tells you of paper jams, toner needed, and the progress of a print job. It's a vast improvement on the idiot lights found on most printers. From the front panel you can also change the printer's settings, such as print darkness; whether or not a start page is printed; and how long the printer waits before going into sleep mode. I especially like the way the printer handles a manual feed job for several copies of the same document: you get a message on the LCD stating "Manual Feed Request" as soon as the printer is ready for the next sheet.

To lower the price, GCC cut some features included in its $1999 BLP II. The BLP II has a SCSI port for an additional font disk, and an optional parallel port for connection to IBM-compatibles, as well as the ability to emulate the popular Hewlett-Packard LaserJet. The BLP II also has the LaserWriter Plus 35-font set in ROM. The BLP Elite eliminates the connectivity features and comes with just 5 font families—17 fonts—in ROM. The old standbys—Times, Helvetica, Courier, and Symbol (when will some manufacturer dump Symbol in favor of a useful font?)—along with Helvetica Narrow.

STEVEN BARATZ

The BLP Elite printer from GCC Technologies

The performance of the BLP Elite was good. Printing times for documents containing only printer fonts were better than those of the Apple Personal LaserWriter NT. In fact, the BLP Elite outperformed the Apple printer with all the documents I printed. Print quality was very good, with rich blacks and crisp edges on type.

The printer handled all the documents I threw at it, with one exception—a legal-size, landscape-oriented PageMaker document with multiple fonts and a large encapsulated PostScript (EPS) graphic created in Adobe Illustrator. Because the EPS graphic contained many downloadable fonts, the printer ran out of RAM space. GCC sells a $299, 2MB RAM upgrade, but you probably won't need it—most documents just aren't that complex. In my case, simplifying the EPS file a bit enabled the document to print with no problems.

Inconspicuous Consumption

The BLP Elite uses a two-part system of consumables. The toner cartridge is rated for 2500 pages and costs $33. You'll also need to replace the EP drum cartridge every 15,000 pages or so, at a cost of $289. For 50,000 pages, this comes out to a consumables cost of about $1600. An Apple Personal LaserWriter NT requires about $1400 of toner cartridges for the same number of pages.

Low Price, High Value

The BLP Elite is a good value. As a shared printer for a small office or workgroup, it's hard to beat. And its low price makes it affordable for the individual who has always wanted a PostScript printer. If you're looking for a PostScript unit and you're on a budget, the BLP Elite deserves serious consideration.—**Tom Negrino**

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Draw Program

MACDRAW PRO 1.0v1

Pros: Revised drawing model; bezier-curve construction; enhanced text-handling; automated gradations; 24-bit color. **Cons:** Insufficient manipulation and effects capabilities; extremely slow to display colors and gradations. **Company:** Claris Corporation. **Requires:** Mac Plus; 2MB for 256 colors, 4MB for more than 256 colors; hard drive. **List price:** $399.

Without a doubt, MacDraw Pro is more impressive than its predecessors. First—and, I think, most important—MacDraw Pro offers a subtly revamped drawing model. Previously, MacDraw relied on a primitive model in which every curve began as a free-form polygon in which any number of points were connected by straight line segments, as in a dot-to-dot puzzle. To emulate a curve, the polygon was *smoothed*—automatically or by command—rounding off all corners. A smoothed polygon was a sluggish amoeba-shape outline that was difficult to control. Rather than passing through points, a smoothed polygon snaked vaguely back and forth between points, approaching but never remotely touching them. If you put points close together, the result was a mass of bumps and kinks; if you dragged points away from each other, you ended up with overly angular shapes that looked like boomerangs.

Curves in MacDraw Pro are still called smoothed polygons, but they are entirely new creatures, closely resembling the bezier curves in Adobe Illustrator and Aldus FreeHand. A curved outline now passes through its points, giving you more predictable and precise control. You can now smooth or unsmooth a single point, combining curves and corners within the same shape.

MacDraw Pro provides a dedicated bezier-curve tool. Although the tool works differently than that of either Illustrator or FreeHand, it provides a comparable level of control. Bezier points can be converted to arcs or corners using the familiar Smooth and Unsmooth commands. You can convert polygons and smoothed polygons to bezier curves, thus giving precise control over the positioning and curvature of line segments.

You might think that the appearance of a drawing would be sacrificed if individual points were maintained as they were in MacDraw II or MacDraw 1.9.5. Luckily, MacDraw Pro does the opposite when converting old drawings: it adjusts the locations of points in order to protect the appearance of the drawing. The conversion is by no means perfect—many curves have to be reshaped manually—but it does show an attention to detail.

Mistakes

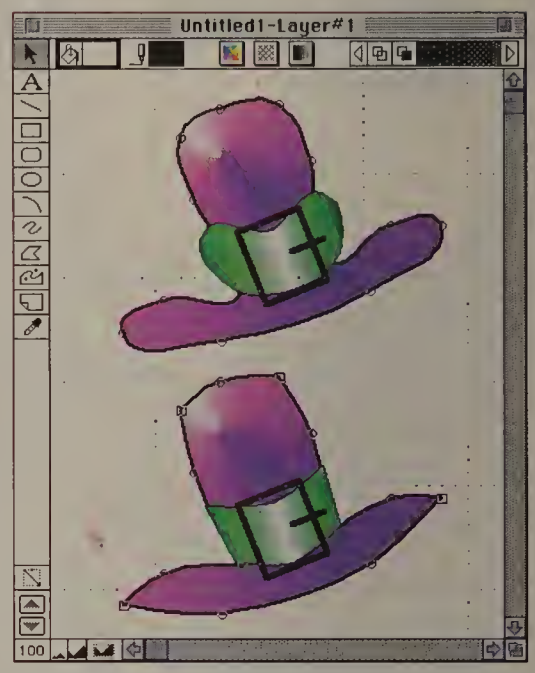
MacDraw Pro still can't slant an object, doesn't offer numerical rotation, and to scale an object to a specific percentage, you must scale it proportionally (height and width are equally affected). Proportional scaling prevents you from condensing or expanding text, features available at least three years ago in Illustrator, FreeHand, and Deneba Software's Canvas. Even QuarkXPress and PageMaker allow you to condense text.

While other programs have improved image creation and manipulation, MacDraw Pro's basic drawing capabilities remain rooted in simplicity.

Shine All the Buttons

In addition to providing a spelling checker, MacDraw Pro allows you to import or open documents created in MacWrite, MacWrite II, or Microsoft Word 4.0. MacDraw also offers a text ruler for setting tab stops and aligning paragraphs, virtually identical to the ruler in MacWrite. These capabilities work to intersperse graphics and labels within large quantities of text, but they're a far cry from the capabilities in dedicated page-composition programs. There's no search and replace, no flowing text into multiple columns, and none of the capabilities that would elevate MacDraw Pro above the level of a text processor.

Am I mistaken or has every Claris ad in the last few months played up compatibility? All Claris products can trade information with one another, but MacDraw Pro has missed the System 7 boat. While it does support



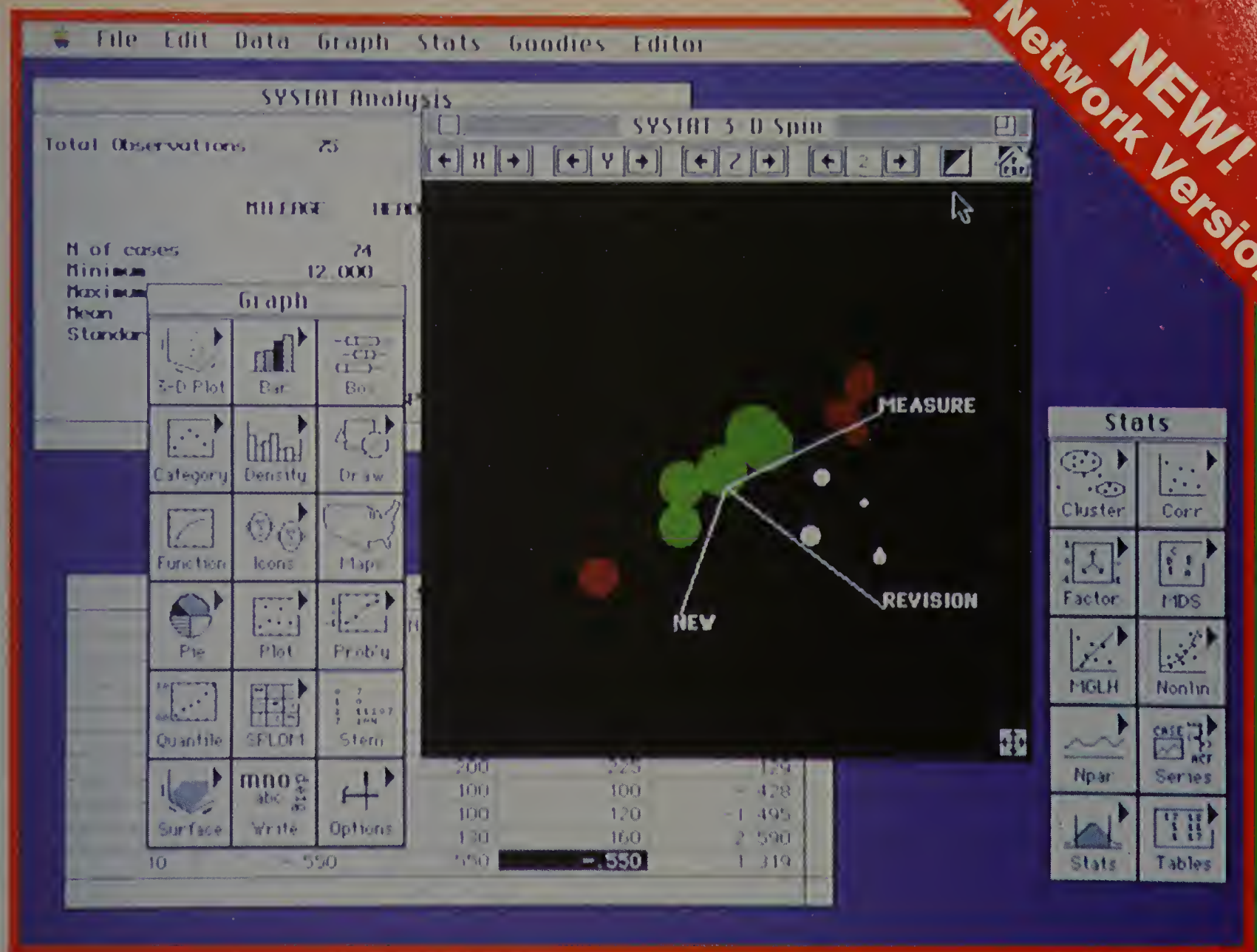
Tipping Your Hat MacDraw Pro allows you to smooth and unsmooth individual points in a polygon or bezier curve. The shapes at the top of the window are entirely smoothed, as they would be in previous versions of MacDraw. In the lower shapes, unsmoothed points show up as tiny squares.

TrueType fonts (up to 6400-point size) and 32-bit addressing, there is no Publish and Subscribe, no background processing, no support for AppleEvents, and no balloon help.

MacDraw Pro also offers enhanced color capabilities, including 24-bit color display, customizable palettes, and Pantone-brand color support. User-definable gradations, possibly MacDraw Pro's most distinctive feature, can contain up to four key colors, flow in any direction, begin at any point in a shape, and progress in a linear or circular pattern. Though MacDraw Pro does not print color separations, the gradation effects can be useful for enhancing presentations and creating artwork to import into an application that does. The program is extremely slow when displaying gradations or other special color effects. Just scrolling the hat drawing shown here took more than 12 seconds on a Mac IIci under System 7. Manipulating objects, changing view sizes, and switching between open drawings are equally slow.

Despite a revamped drawing model, the concise use of tools and palettes, and a tightly structured, intuitive interface, MacDraw Pro lacks capabilities users rely on. MacDraw Pro might well be the underachiever of the year.—**Deke McClelland**

See **Where to Buy** *for contact information.*



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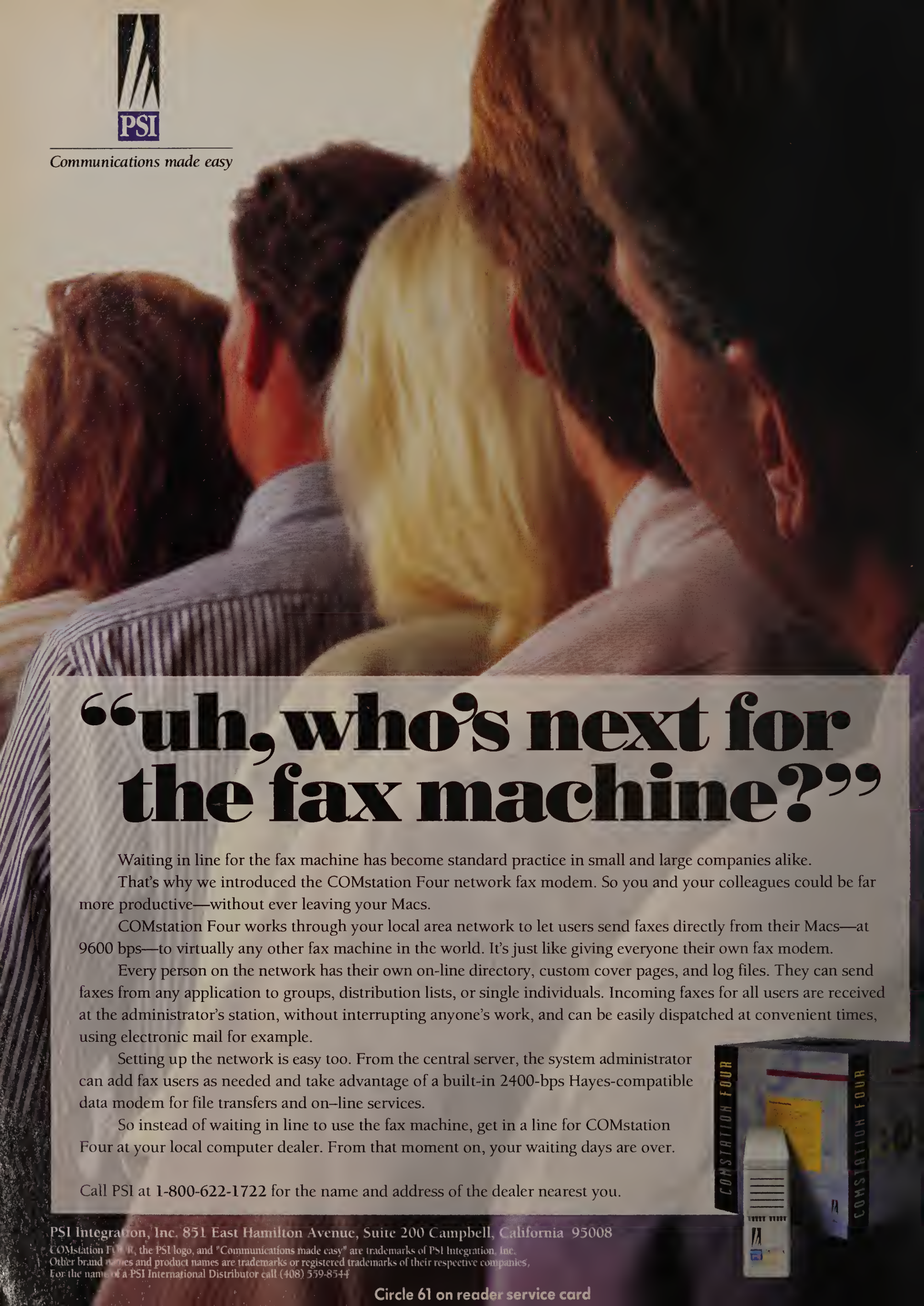

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Circle 61 on reader service card

Gray-Scale Scan Editor

ENHANCE 2.0

Pros: High-end features at a low price. **Cons:** Bogs down on very large files. **Company:** MicroFrontier. **Requires:** Mac SE/30; 2MB of RAM; System 6.0.3; hard drive. Recommended: 8-bit gray-scale or color video board. **List price:** $375.

Enhance 2.0 doesn't compete with the other gray-scale scan editors on the Mac market—it leaves them in the dust. This program has far more in common with Adobe Photoshop, the Mac's 24-bit image-processing standard-bearer.

Enhance 2.0 has all the features people expect in a scan editor, along with a few new twists. It's reliable and runs at reasonable speeds on all but the largest files. And Enhance's interface has been completely redesigned to make its many tools convenient, sometimes even fun to use.

Low-Priced Power

For an inexpensive program, Enhance 2.0 offers some sophisticated features. Take antialiasing. Enhance 2.0 automatically smooths the edges of text, the results of most paint and draw tools (including the bucket), and any selection that you might paste, rotate, resize, or distort. In many situations, Enhance's antialiasing looks better than that of Photoshop 2.0. It is also more flexible: not only can you set the degree of antialiasing, but you can also specify whether the antialiasing will proceed inward or outward from a selection—surprisingly useful.

Enhance has always had the ability to save masks that protect parts of an image. In the past the masks were 1-bit only, which meant areas were either protected or unprotected, all or nothing. Version 2.0 offers 4-bit and 8-bit masking, which means you can, for example, feather a mask to make the edges less noticeable.

Since gray-scale scans commonly run to multiple megabytes, good memory management is critical. Enhance's virtual memory, which works with or without System 7, is quite clever. Under some virtual memory schemes—Photoshop's, for example—it's common to "run out" of hard drive space when you might actually have lots of unused storage available. Some programs store all their Undo and other temporary files on one drive. If that drive fills up, the program ignores any other hard drives you might have and gives an "out of memory" message. Enhance 2.0 allows you to specify a hierarchy of storage devices; when the program fills one, files spill over to the others.

Enhance's designers offer multiple Undos. Enhance saves only the changes instead of whole images whenever possible, and it flushes all but the most recent Undo when memory is needed for other functions.

Every major program area—from the interface and file-management functions; to retouching and selection tools; to printing, filter, and gray-level controls—has improved significantly.

Standing in the Shadow

If your only choices were Enhance, Aldus's Digital Darkroom, Letraset's ImageStudio, or Micrografx's Picture Publisher, picking would be simple. The other Macintosh gray-scale programs just don't have Enhance's up-to-date feature list. None, for example, have the ability to save a mask or to antialias a selection—two features I can't imagine being without. Picture Publisher and ImageStudio can't even paint with transparency.

The real choice is between Enhance and Photoshop 2.0, which costs twice as much (ColorStudio 1.5, due this fall, is also being redesigned to work with gray-scale files). Two considerations will probably be the determining factors for most people.

The first is speed. Enhance is reasonably fast with files of 1MB or 2MB (for reference, 2MB is roughly an 8-bit, 8-by-10-inch, 150-dots-per-inch scan). With files of 4MB or 5MB, however, few people will have the patience to stick with Enhance. On large files, Enhance seems particularly slow to anyone who's tried Photoshop, since Enhance lacks one of Photoshop's most-beloved features: the ability to interrupt redraw.

The other critical difference relates to basic image quality. Sharpening and interpolation are two image processing functions used on almost every scan. Photoshop 2.0's Unsharp mask provides a level of control Enhance can't match. This means that when using Enhance, you're more likely to sharpen details inappropriately, bringing out the pores in a face, for example, or the grain of the film.

Interpolation occurs whenever you recalculate an image's shape, size, or orientation. The difference between the two programs is most obvious when you rotate a file or distort an image using a function like Perspective. Photoshop does the job seamlessly; edges and textures noticeably break up in Enhance. When you scale a scan or change its resolution (resample), the difference between the two programs is more or less noticeable, depending on the image.

Photoshop takes up twice as much space on a hard drive as Enhance. If you're not planning to move on to color, you don't work regularly on very large files, and you don't demand the highest possible quality, Enhance is a suitable tool. In any case, give it a try. It should do just about everything you want it to, and you'll save some cash.—**Joe Matazzoni**

See **Where to Buy** *for contact information.*

Face, Interface One of Enhance 2.0's nice interface touches: the center dialog box lets you test filter operations quickly. At left, note the three icons in the floating tool palette's bottom row. These icons change to provide the most commonly used options for whatever tool is selected. At right are the Scratch Pad, for brush testing, and the Brush Controls.

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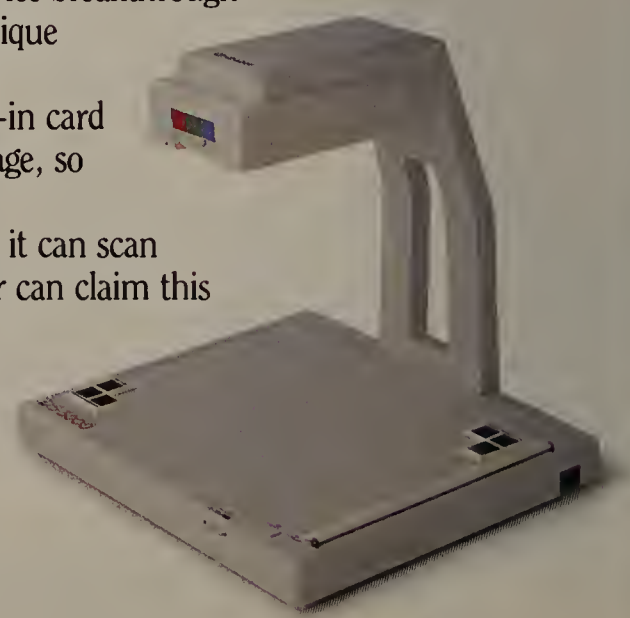

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Preschool-to-Elementary Reading Drills

READINGMAZE 1.0

Pros: Good manual with clear tutorials; excellent for individually paced instruction; runs equally well in color or black and white. **Cons:** Game play and rewards may be insufficient to keep children interested. **Company:** Great Wave Software. **Requires:** Mac Plus; System 6.0.7. System 7–savvy. **List price:** $49.95; color $69.95.

By combining good curricula and good play, Great Wave Software has achieved a long and honorable record of award-winning learning games, such as KidsTime. Unfortunately, ReadingMaze does not quite meet the standard set by Great Wave's earlier programs. It scores points for content, but its game aspects are comparatively weak.

A Mostly Class Act

The program comes with two applications—ReadingMaze and ReadingList. ReadingMaze enables parents and teachers to set up practice drills geared to individual children's reading ability—from prekindergarten level to second grade—and to produce statistics evaluating each child's progress. ReadingMaze's practice, review, and mastery levels increase in difficulty from matching pictures through recognizing complete sentences; you can add and modify levels; and if you're running System 6.0.7 or later, you can add prerecorded words for any objects pictured. ReadingList is for editing the student roster and assigning lessons; teachers can also use it to set up multiple reading groups in a classroom and to password-protect students' progress files.

Object Lesson

Once a child logs on, his or her name appears as a menu from which to choose drills, access statistics, and select new mazes (see "Student Menu"). Students can move back to the previous (lower) level or forward to the next (higher) one. (Holding down ⌘-option while pulling down the student menu lets a user move more than one step at a time.)

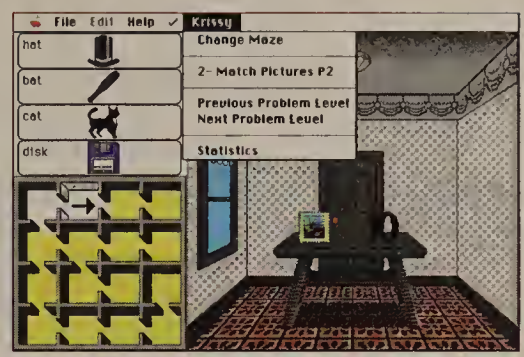
The main screen is divided into three parts. The right-hand side shows a room with one or more objects on a table. The left-hand side of the screen is divided into a list at the top—pictures, words, or both, depending on the practice level—and at the bottom, a maze viewed from above. An arrow in the maze indicates the direction you are facing, and you move room by room through the maze by clicking either in the maze or in the picture. Clicking on different parts of a picture changes the perspective of the room; doors lead to other rooms with different objects on the table. To evaluate ReadingMaze I had two young testers; they found comparing the maze and room views a bit confusing and opted to navigate by means of the maze alone.

You play the game by moving through a maze and picking up (by clicking on) objects. Clicking on any object on the table—whether from the list or not—brings up a book, which slowly opens to a series of three drills. After successfully completing these, you return to the main maze screen to continue the quest. Once all the items from the list have been collected, a bookcase appears. Clicking on a book in the bookcase opens up a book to show the collected objects in random motion. The four-year-old tester thought this was pretty cool and the six-year-old thought it was "all right," but both wished they could interact with the animated objects. Just watching them float on the page seemed insufficient reward for all their hard work.

The Change Maze command lets you vary the number of rooms and objects, include secret passages, and—a favorite with the testers—add an animated elf. Be forewarned, though, that being in the same room with this friendly companion relocates you to another part of the maze, which may or may not be helpful. Exploring the whole maze often requires backtracking, especially for younger children—which is somewhat frustrating, given how slowly the graphics change.

Reading Lessons

Advanced students are asked to distinguish sentence fragments from complete sentences, for example, or to move objects from the left page to a colorful, if not riveting, picture on the right. A lesson on prepositions requires students to click on and drag objects over, beside, under, or to the left or right of something in the picture. The objects rarely have any logical connection with the picture, but this doesn't seem to bother kids (it probably doesn't seem any stranger than many other things adults ask them to do). At less advanced levels, the tasks are simpler: matching a picture on the left with a picture on the right, or with its initial letter, or with a whole word. Completing one set of drills brings up a reading certificate, and the student automatically advances to the next level.



Student Menu The Student Menu is used to change levels and curricula from within the ReadingMaze application. The menu also lets you modify maze layout and add a capricious elf, just to keep things interesting.

A-Maze-ing Objects

One of ReadingMaze's nicer touches is animated objects. One example is a tiny man who walks through a doorway that opens and shuts, and there's a faucet that drips and a shovel that digs. But the 214 objects repeat fairly frequently— a possible drawback over time, as the novelty wears thin. Also, many of the objects to be collected from the maze show up in the drills, and this can confuse a younger child.

Overall, ReadingMaze is well documented and well designed for self-paced instruction, but it is unlikely to captivate children at home, where they have come to expect more excitement, a faster pace, and a more attractive payoff from computer games. It's likely to be a bigger success in the classroom, where it presents a welcome change in routine.

—Louise Kohl

See **Where to Buy** *for contact information.*

Geometry-Teaching Program

THE GEOMETER'S SKETCHPAD 1.01

Pros: Easy construction of figures; dynamic measurement; scripts for animation; advanced recursive graphics. **Cons:** None. **Company:** Key Curriculum Press. **Requires:** Mac Plus; second disk drive; System 6.0. **List price:** $169.95; ten-user lab pack $399.95.

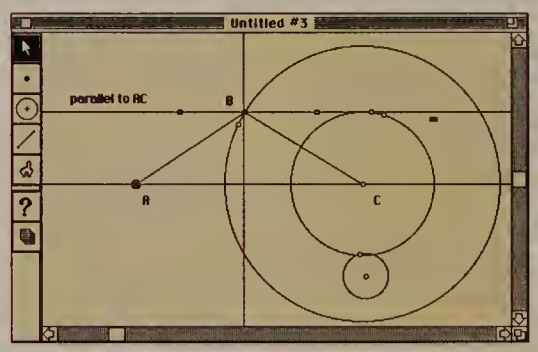
Two thousand years ago, or so, an aristocratic student complained about the difficulty of studying Euclid and was told, "There is no royal road to geometry." The fundamental hurdle has always been to understand the connection between sequences of formal logical steps and stocks of basic information about geometrical figures. If not a royal road, Geometer's Sketchpad is at least a quick bypass around that particular obstacle. By encouraging experimentation with the elements of geometry, the program helps students demonstrate for themselves the facts that constitute the basis for proofs and deductive reasoning.

Quick Sketch

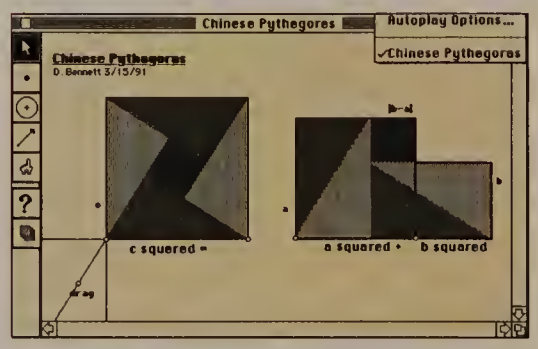
Geometer's Sketchpad gives you a Sketch window with a straightedge and compass—the Macintosh version of the tools that the ancients used (see "Back to Basics"). You also get a pointer for labeling points in a diagram. These basic tools let you draw every plane figure in Euclidean geometry. Using commands from the Construct menu, you can introduce parallels and perpendiculars, bisect angles, and locate midpoints of segments. Choosing commands from the Transform menu, you can then rotate, translate, reflect, and dilate figures or parts of figures. The Measure menu serves as an on-screen ruler, protractor, and planimeter, giving measurements (to user-specified precision) that update dynamically when you modify selected structures.

What makes this a genuine geometry-teaching system is the inclusion of animation and a macro facility called Scripts. The Animation command in the Display menu takes selected sets of points in a sketch and sends them through repetitive motions. Sample animations illustrate plotting trigonometric functions; easy extensions of these can be used to demonstrate the connection between geometry and basic physics (Kepler's law, for example). Note that to show physics applications you need the math-coprocessor–enabled enhanced version of Geometer's Sketchpad for acceptable speed.

The macro recorder that produces scripts translates actions in the Sketch window into clear English-language descriptions, complete with labels for sketch elements. You can develop a script, for example, to draw a regular hexagon inside a circle, or trace out a conic section, and you can play the script in either step or continuous mode. Because the command set supports recursion, scripts can be invoked repetitively to act on elements of sketches, filling the window with Sierpinski gaskets, Koch snowflakes, or other, less-exotic figures. Unlimited undos enable you to step backward through a construction.



Back to Basics To draw simple figures in Geometer's Sketchpad, you use a toolbox restricted to the tools that were available to Euclid—the straightedge and compass. Other commands draw parallels and perpendicular lines, and reflect or rotate figures.



Seeing All the Angles Geometer's Sketchpad comes with dozens of demonstration files, including this interesting visual proof of the Pythagorean theorem. Advanced demos range from conic sections to fractals.

Teachers can set up demonstrations that draw constructions used in a proof and display notations or comments on screen to explain them. Whole lessons can be structured this way, demonstrating a concept visually until the students literally get the picture.

To encourage students to use the scripting facility, Key Curriculum has loaded the sample files with dazzling scripts for creating fractals and with scripts that teach the basic geometry of triangles and circles and quadrilaterals. For example, a teacher can prepare a script on finding the area of parallelepipeds for students to investigate step-by-step, reading each element of the construction with accompanying text explanations. A fast playback script, by contrast, can demonstrate sine waves, planetary motion, logarithmic spirals, or other figures for which action is appropriate.

Teacher's Pet

Key Curriculum has done everything possible to make a teacher want to persuade his or her school to spring for the Sketchpad ten-pack. First, the user's guide is superbly produced, assumes no computer or Mac expertise, and anticipates most beginners' questions. Second, much of the core instruction has been encapsulated in the Sample Activities booklet or in script files demonstrating various constructions in geometry—a teacher doesn't have to cobble together the whole first semester's demos from scratch (see "Seeing All the Angles"). Finally, although the program can be used with any standard geometry text, it's perfectly matched to Key Curriculum Press's *Discovering Geometry* (1989), by Michael Serra, an outstanding text by an outstanding secondary-school math instructor.

Based on an initiative funded by the National Science Foundation, Geometer's Sketchpad shows there's just no substitute in software development for gobs of other people's money and loads of testing time. It recognizes classroom realities, provides all sorts of explorations for advanced students, and dutifully assists with routine teaching chores, such as formulating and printing quizzes.

—Charles Seiter and Mary S. Toth

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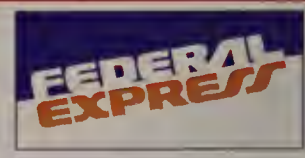

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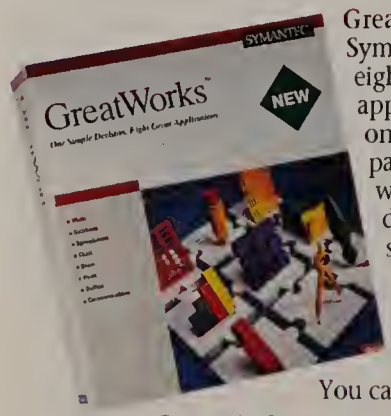

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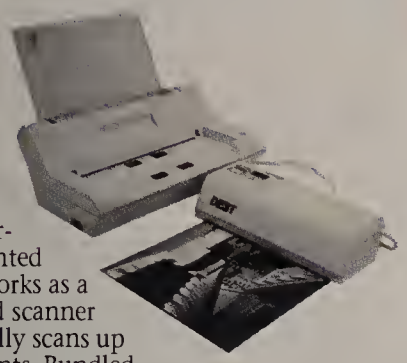

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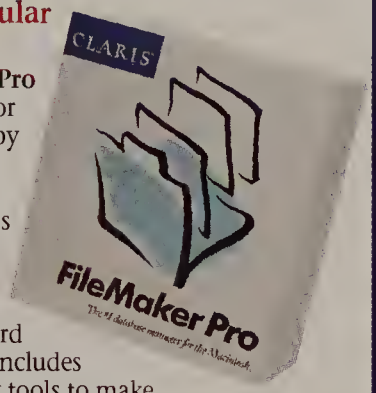

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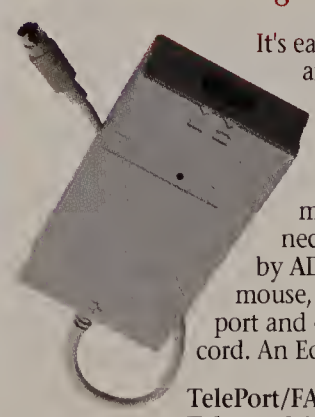

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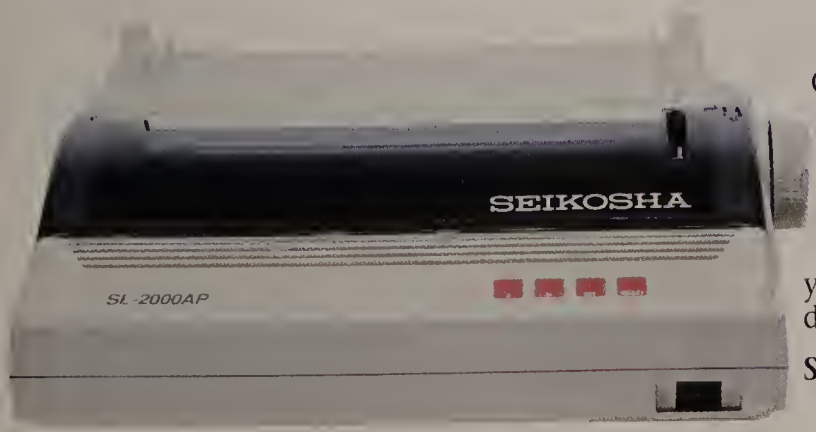

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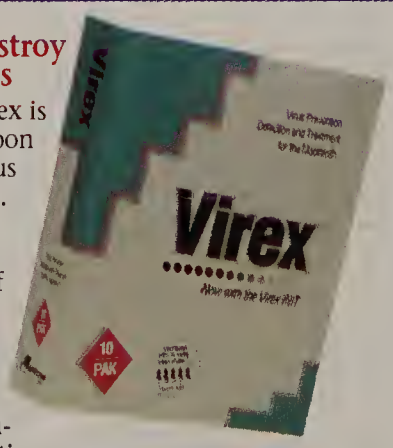

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Group Schedulers

MEETING MAKER

Pros: Can scan for first open time slot; good use of icons and symbols; minimum time slot is 15 minutes; supports appointment notes; supports most popular paper-based appointment-diary formats; can set individual work hours, holidays, and days off. **Cons:** Uses its own server technology; lacks a single-day view of appointments; can't send enclosures with meeting message. **Company:** On Technology. **Requires:** Mac Plus; AppleTalk network; System 6.0.4. **List price:** 5-user pack $495, 10-user pack $895.

MICROSOFT SCHEDULE+ 1.0

Pros: Uses same directories and groups as Microsoft Mail; easy to use; calendar information can be exported. **Cons:** No customization for working hours or holidays; time slots restricted to 30 minutes; single-day view of appointments only; limited printout forms; notes field is for entire day; resources and equipment treated as users. **Company:** Microsoft Corporation. **Requires:** Mac Plus; hard drive; System 6.0.2; Microsoft Mail 3.0; AppleTalk network. **List price:** 5-user pack $195; 20-user pack $775 (Microsoft Mail server $395, Microsoft Mail 5-user pack $395).

Are you always playing telephone tag, trying to line up that crucial departmental meeting? Networked computers are supposed to make that easier. Electronic mail helps some, but a special genre of software called *group schedulers* goes a long way toward keeping track of your schedule as well as that of your coworkers.

Meeting Maker and Microsoft Schedule+ operate roughly the same way. First, install the server on one of the Macs to keep track of everyone's schedule, and then install the desk accessory so users can view and plan their schedules as well as coordinate meetings. Users can assign visual and audio alarms to any appointments.

Planning a Meeting

To coordinate a meeting using either program, you select a time slot and create a message that outlines the meeting. Schedule+ lets you select the users you want at the meeting, and then displays a composite schedule for the day, graying out time slots during which someone isn't available. Meeting Maker can automatically scan the schedules for an open time slot (you can also select one manually, or override the automatically selected slot). In automatic scan mode, Meeting Maker does not schedule beyond the user's regular work hours.

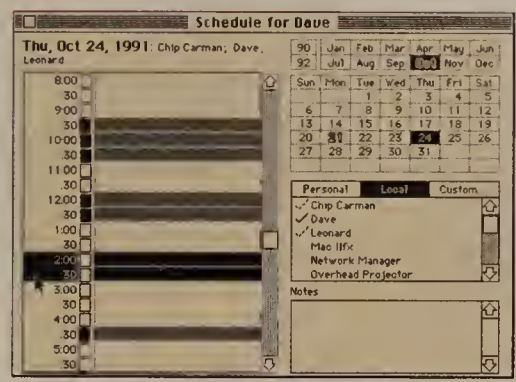
After you've selected a time, you can compose a message to your coworkers to see if they can attend. Meeting Maker forces you to select required and optional attendees. If a required attendee can't attend, Meeting Maker asks you to reschedule the meeting. I like the rescheduling feedback, but I think the distinction between required and optional attendees is unnecessary.

Get the Message?

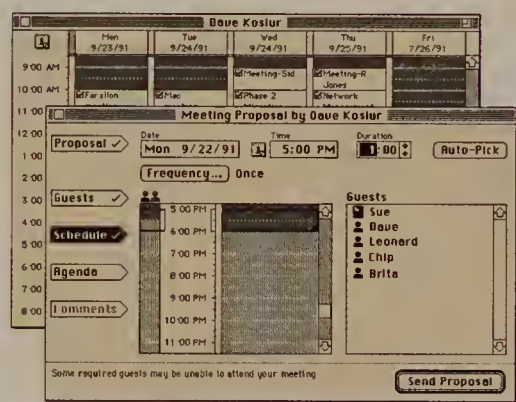
Microsoft gets a plus for addressing and sending meeting proposals, mainly because Schedule+ uses Microsoft Mail as a backbone. You can use the same names and groups in Schedule+ as you use in Microsoft Mail. If you already have an E-mail system installed and use Meeting Maker, you have to keep track of two separate directories, one for E-mail, the other for Meeting Maker.

Using Mail as the backbone for Schedule+ does add one inconvenience. Mail doesn't distinguish between people and resources (like rooms or AV equipment). To include rooms in a meeting schedule, you must make each room a licensed user. Meeting Maker treats resources separately and allows you to have as many resources as you have users (it'd be nice to have even more, but this approach is better than Microsoft's).

Both programs use predefined forms for meeting proposals and replies. Microsoft's forms are E-mail forms and have all the attributes of E-mail, so you can include enclosures with the meeting proposal. Meeting Maker doesn't let you attach enclosures. You can paste text into an



Schedule+ Microsoft Schedule+ uses a one-day display for all schedule displays. In this example, three users have been selected for a meeting (checks appear in front of users' names). The times when at least one of them will not be available are grayed out in the left-hand part of the window. The black band starting at 2:00 p.m. is the time selected for a proposed meeting.



Meeting Maker The rear window shows a five-day schedule, with appointments marked with check boxes. The front window shows a meeting proposal, where a time has been selected. The time is past the working hours of Sue, indicated by the moon and stars symbol before her name.

Agenda field when you create a meeting proposal; however, this is not an adequate solution if you're planning to distribute a spreadsheet or other report for review before the meeting. A definite plus for Microsoft.

If you are going on the road without a computer, you need a way of taking your schedule with you. Schedule+ provides generic-format printouts. Meeting Maker goes one step further and includes printing formats for many popular appointment diaries, such as Day-Timer, Day Runner, Filofax, Lefax, and Franklin Planner. Meeting Maker gets a plus for this feature.

Unfortunately, Meeting Maker does not offer an option for exporting calendar data. Schedule+ offers straight text or tab-delimited text formats. While not a complete solution if you use electronic pocket calendars, Microsoft has a slight edge.

(continues)

Will You Make the Meeting?

I found both programs easy to set up and use. Schedule+ has a simpler interface, while Meeting Maker looks a bit complicated at first. However, Meeting Maker's schedule display uses symbols for different types of appointments and meetings (a meeting someone has declined to attend, for example). Schedule+ should offer an option to display more than one day at a time. Both programs notify you of an impending meeting, but Microsoft's offers more customization.

Both programs allow you to assign an assistant (Meeting Maker calls it a proxy) to review and alter your schedule.

I prefer Meeting Maker. It has most of the features I need and has a well-designed schedule display. If On Technology would add a data-export feature and support enclosures, Meeting Maker would be the top-notch program for group scheduling. Meeting Maker costs only $99 per user, while setting up Schedule+ from scratch costs from $197 per user (for 5 users) to $125.95 per user (20 users) when you factor in the price of Microsoft Mail. Schedule+ does come out ahead if you're already using Mail 3.0 (it's only $39 per user in that case), since Schedule+ is a natural fit with Microsoft Mail.—**Dave Kosiur**

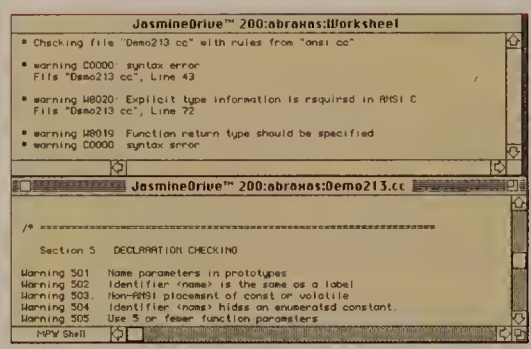
See **Where to Buy** *for contact information.*

C Programming Tool

CODECHECK 3.01

Pros: Flexible; fast; critically helpful for large programming projects. **Cons:** Minimally Mac-like. **Company:** Abraxas Software. **Requires:** Mac Plus; Macintosh Programmer's Workshop. **List price:** $495.

Among programming languages, C is the genie in the bottle: it can do nearly anything you ask, but you have to be careful about your wish list. The C version of a program is usually more compact and operates a bit faster than versions coded in other languages; but because C gives programmers direct access to machine hardware, right down to individual bits in memory, these programs are often plagued by maddening mystery bugs.



Check, Please You invoke CodeCheck at the command line in the MPW shell, and the check results appear in the Worksheet window.

CodeCheck provides a way to force C code (or in this version, C++ code) written by a programmer or programming teams to conform to standards that make programs more readable, maintainable, and portable between computers—and more resistant to those subtle flaws that appear when a program is ported to a different operating system. Project managers responsible for software that will have both a Mac and a Windows or OS/2 version will also find this program to be a great bargain.

Check It Out

CodeCheck doesn't check for outright bugs—the compiler is supposed to do that. Instead, it checks for matters of programming style that are likely to cause problems when you recompile your source code using another compiler on different hardware. As a side benefit, CodeCheck automatically invokes rule sets that check for errors that compilers may not find, elements of style that make code difficult to read, and algorithmic complexity and code density. CodeCheck is written from a very specific viewpoint, enunciated in a thundering jeremiad at the beginning of the manual. Briefly put, it contends that a C construct like this:

```
#define put(x,p)
(—(p)->cnt>=0?(*(p)->
ptr++=(x)):flush(x,p))
```

is bad rather than clever, that the author of this tricky macro is likely to forget how it works, that it will give other programmers severe maintenance headaches, and that some compilers' preprocessors will simply choke on it anyway. CodeCheck's aim is to enforce a style in which the programmer's intent is evident on first reading, not requiring you to puzzle out several examples.

Here's how it works. You double-click on the CodeCheck icon to call up the Macintosh Programmer's Workshop (MPW) shell. The MPW Worksheet window displays a script that identifies the command-line options available for the check routines. Since most portable C software developed on the Mac is headed either up to a VAX or down to a PC, you will probably indicate the appropriate rule set at the command line. Abraxas has included rule sets that cover standard C++ and extensions to C in Borland and Microsoft compilers for the PC. Thus the command

```
check -K5-L-Rnewrules.cc
hardisk:source:mycode.c
```

uses a set of style rules to check your mycode.c source for compatibility with ANSI C++ (the -K5 option). This command (-L) also produces a listing of the warning statements, generated by checking, interspersed in the source code. This is typically necessary for all but the tiniest help files, since the warnings are reported by line number—you'd be heartily annoyed looking for line 13,215 in your original unnumbered source listing.

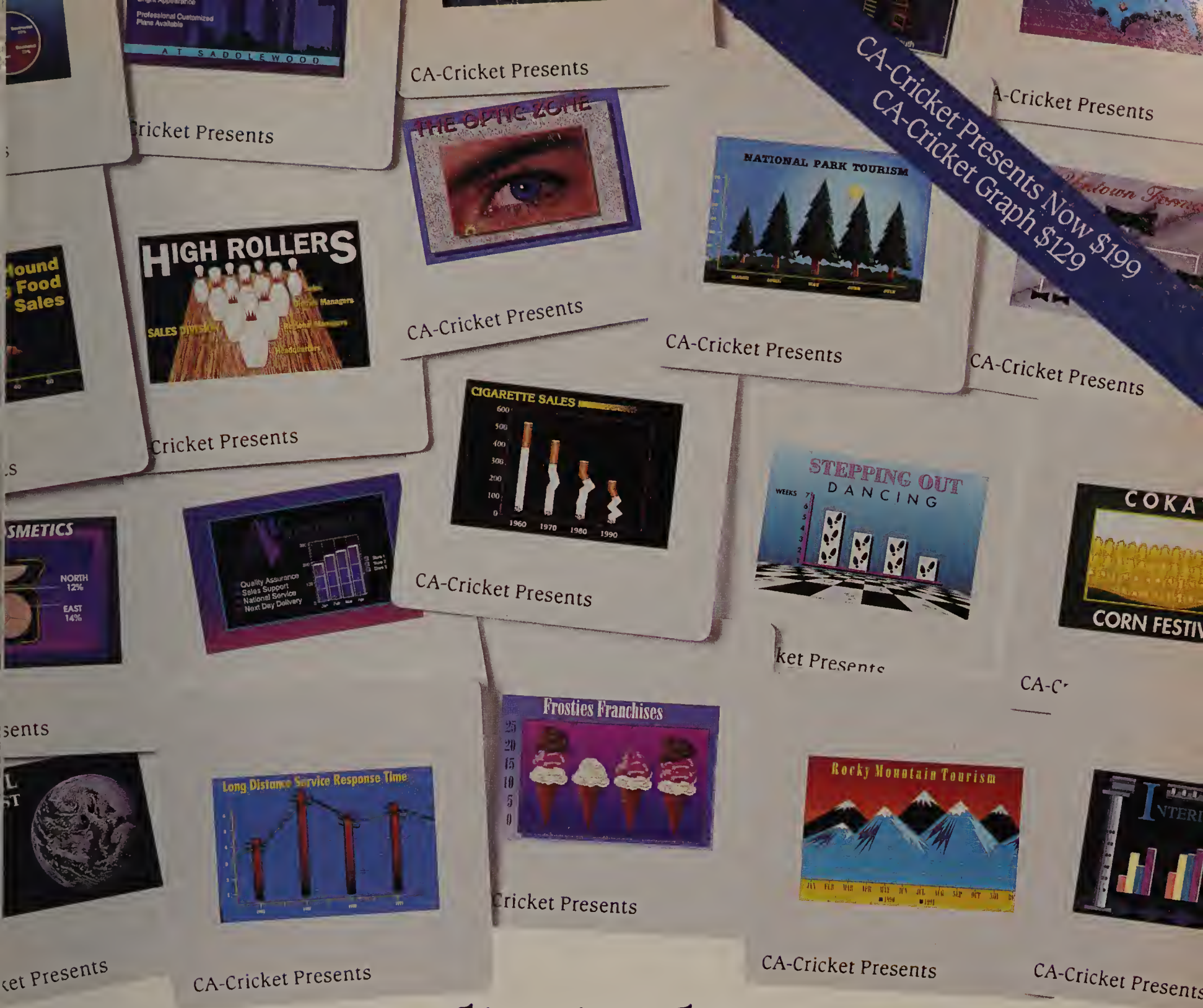
The R option lets the user pick custom "rule files," collections of IF-THEN statements written in CodeCheck's own subset of C language. These can be assembled from sets of style rules that Abraxas provides. Or programmers and project managers can code custom rule files for special purposes such as enforcing conventions on variable names, or tailoring the checking process to fit the particular quirks of a target compiler.

Finally, CodeCheck can work with whole project files (identified by the extension .ccp). The program is fast enough to check large projects conveniently. On fairly verbose code that was producing a warning only every 100 lines or so, CodeCheck clipped through a 120K file in 50 seconds.

The Real Thing

This product is likely to interest only professional programmers using MPW C or Think C. The CodeCheck manual is tantamount to a graduate education in avoiding odd C problems; the pro-

(continues)



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gram's expert-system core is remarkably sophisticated; and the technical staff at Abraxas (who also wrote MacYACC and PCYACC) is helpfully authoritative about non-Mac C environments. If you're even considering porting some Mac C code, you need CodeCheck.—**Charles Seiter**

See **Where to Buy** *for contact information.*

Low-Price Color Scanners

DS-3000 COLOR SCANNER

Pros: Inexpensive; scans three dimensional as well as flat art. **Cons:** Limited to 12 bits and 75 dpi; mediocre quality. **Company:** Chinon America. **Requires:** SE/30 or Mac II; 2MB of RAM; System 6.7; hard drive. **List price:** $995.

NISCAN SPECTRA

Pros: Inexpensive; 24-bit and 400-dpi; good quality. **Cons:** Scan area limited to 4 inches by 6 inches; very slow. **Company:** Nisca. **Requires:** SE; 2MB of RAM; System 6.0.5; hard drive; 9-to-25-pin external modem cable. **List price:** $995.

When I rate scanners, I look at three points: price, quality, and convenience. Two new color models—Chinon America's DS-3000 and Nisca's Niscan Spectra—both list for $995, which puts price firmly on their side. Neither unit, however, scores more than two for three on the above criteria. If you want an inexpensive color scanner, you have to compromise on either quality or convenience.

Chinon DS-3000

The Chinon DS-3000 is an overhead model with a built-in light table. It scans flat art up to 8½ by 11 inches, and three-dimensional objects up to 2 inches deep. Its top scanning resolution is 75 dots per inch, and it registers only 4096 colors (12 bits) per image—a limitation that disqualifies it as a tool for people who are interested in making professional-quality color separations. Its main audience will be multimedia producers who occasionally want to put some color on screen, and desktop designers who use color for-position-only (FPO) scans.

The unit is made from ill-fitting components that obviously weren't designed for each other (it requires three separate power cords, for example—one each for the scanner itself, the lights, and the SCSI adapter). The operation is primitive too. There's no frame to hold the original image; you have to tape its edges down so they lie flat. To complete a scan, you have to physically move a switch on the scan head, when prompted, to change the red, green, and blue filters. The unit's manual and software are pretty rudimentary, and the scanning module provides only the most basic controls.

Of course, given the low $995 price tag, these criticisms are not necessarily grounds for complaint. If the device consistently delivered good-quality color, all would be well. Unfortunately it doesn't.

The biggest problem is dynamic range: the DS-3000 doesn't read dark colors particularly well, and it's unusually bad at registering light colors. I scanned a photograph of the *Macworld* staff, for example, and no matter what setting I used, the light areas on some people's faces came in dead white and certain colors dropped out completely. The lights are another problem. They're neither adjustable nor properly balanced, which means that full-bed scans go dark in the corners but have hot spots at the left and right edges.

To be fair, the DS-3000 does a good job on some images—chiefly those that don't depend on highlight or shadow detail. Multimedia producers who learn to work within this device's limitations may get just the colorful touch they want. Less judicious users may simply make their products look cheap. For designers, a poor scan probably isn't worth the effort as a visualization aid; colors may not match, detail is lacking, and 75 dpi means that the image breaks up and looks pixelated if you enlarge it at all.

Niscan Spectra

The Niscan Spectra works a bit like an upside-down flatbed scanner; you place the scanner on top of the artwork, instead of vice versa, and the scan head and lights progress across the 4-by-6-inch scanning area. It's sturdier than the Chinon, and it's portable.

A 24-bit (6-million-color) device with a maximum optical resolution of 400 dpi, the Spectra makes excellent scans for such an inexpensive device—definitely in the same ballpark as color flatbeds costing twice its price. The Spectra's scan quality is good enough for publication, but it is the slowest scanner I've ever used.

How slow? At 300 dpi, a 4-by-6-inch scan takes about *40 minutes.* Naturally the scanner works faster at lower resolutions, but a 150-dpi scan still takes about 10 minutes, a 75-dpi scan about 3½ minutes.

ANNE NADLER

The Chinon DS-3000 color Scanner (top) and Nisca's Niscan Spectra (bottom)

Devil of a Decision

Choosing between these two scanners isn't easy. Quality considerations argue for the Spectra. But 40 minutes—or even 10 minutes—is an awfully long time to wait for a scan. And unless you always work with snapshots, this unit's small scan area is a serious limitation. In addition, the only software the Spectra comes with is a relatively clumsy scanning desk accessory. Nisca doesn't give you any image processing software, which you will most likely want in order to make your scans look as good as possible—even if only for on-screen purposes. Unless you already have a program that enables you to sharpen and retouch images and

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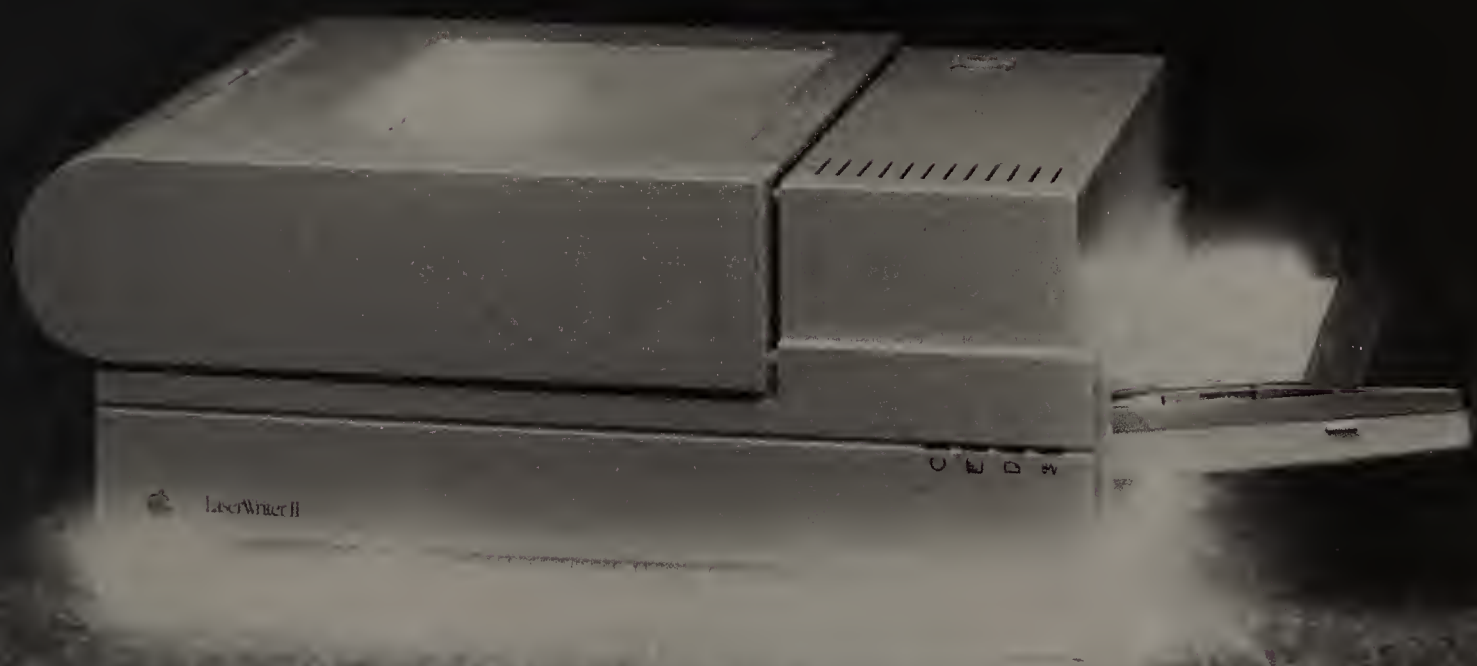
Deep Inside Your Old LaserWriter Lurks A 600 x 600 dpi Superprinter.



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adjust brightness and color values, your budget solution may end up not saving you much money.

The Chinon lets you work with larger artwork, and it comes with some minimal image processing software (it's no substitute for Photoshop). But the unit's applicability is severely limited by its low resolution and lack of dynamic range.

If you are really strapped for cash but need color input, both these units are improvements over the hand scanners that previously owned the under-$1000 color-scan market. But to my mind, an inexpensive color flatbed is a better value. The Chinon and the Spectra probably both have their niches, but frankly it's hard for me to imagine the ideal user for either one. It would need to be someone who had $700 (I'm talking street prices now) to spend on a very limited tool but couldn't afford the extra $700 to $800 it would cost to buy a low-end color flatbed scanner that provided the Chinon's format flexibility (except the ability to scan 3-D objects), quality equal to or better than the Spectra's, faster scanning than either device's, and a copy of Photoshop.

—Joe Matazzoni

See **Where to Buy** *for contact information.*

College-Level Statistics Instruction

STATVIEW STUDENT 1.0

Pros: Implements much of professional StatView program; supports color; coordinates well with standard textbooks. **Cons:** No Help module; some exploratory graph types missing. **Company:** Abacus Concepts. **Requires:** Mac Plus; 512KE of RAM; second disk drive. **List price:** $99; academic discount available.

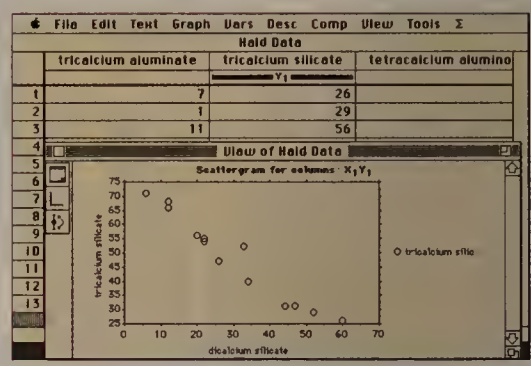
College students in majors from anthropology to personnel administration often find statistics the most challenging math course they face. It's the "obstacle" course, apt to elicit the same terror that organic chemistry does for premeds.

Fortunately, a good computer program makes learning statistics much easier. It can generate interesting illustrations of statistics principles, provide graphs to clarify plain tabular calculations, and keep students from bogging down in the tedious arithmetic of regression and analysis of variance (ANOVA). It's also helpful that most statistics programs for students are limited versions of professional programs, which means students will be familiar with at least one of the leading statistics packages they will probably use later on in their career.

Too Cool for School?

Although limited to 50 variables and 500 cases per data set, in most other respects StatView Student looks more like a respectable commercial statistics program than like a student edition. It includes most of the statistical tests provided in the earlier program StatView 512+ and color graphics as well. You get standard descriptive statistics and an assortment of nonparametric tests: chi-square, Wald-Wolfowitz runs, Kolmogorov-Smirnov tests, Mann-Whitney U test, Kendall rank, Wilcoxon signed-rank, and Spearman coefficient. Besides the expected t-tests, the program includes ANOVA and repeated-measures ANOVA, contingency tables, and regression analysis (simple, multiple, and polynomial). StatView Student generates six graph types including box plots, and offers a nice set of controls for labeling and scaling graphs, and modifying plot symbols and tick marks. StatView Student has a Transform command for recoding data, and uses Abacus's intelligent import facility, which can distinguish category labels from data, and also handles a variety of delimiters.

Curiously, one of this program's greatest strengths as an educational device is its relatively unimaginative approach. This is not really a program for exploratory data analysis (EDA) or newer types of graphics-based investigation; in fact, some EDA features of StatView 512+ have been removed. StatView Student expects you to organize numbers in spreadsheet format and to use the variety of standard statistical tests found in undergraduate textbooks. If your college course uses, for example, Afifi and Azen's



Classic Stats StatView Student is basically a version of the classic Mac program StatView 512+, omitting advanced multivariate stats and adding improved graph customization.

Statistical Analysis: A Computer-Oriented Approach (Academic Press, 1979), you will find that the 180-page manual for StatView Student amounts to a guide for helping you with the end-of-chapter problems. The program and sets of tests available as menu items coordinate well with most textbooks from the past 15 years or so; the StatView Quick Assignment feature makes the tests particularly easy to use.

The Law of Large Numbers

StatView Student is a wonderful aid, far superior to the shareware statistics programs often found around universities. For two categories of statisticians-to-be, however, other programs may be more appropriate. If you are taking a course that covers only descriptive stats, t-tests, and linear regression, you may want to get MyStat, a $5 gem from SYSTAT that offers a good assortment of tests and will soon feature an expanded manual. If your course emphasizes the newer style of exploratory data analysis, the $27.95 student version of DataDesk (from Data Description) is based on exploratory concepts and includes an exceptionally useful 300-page text (published by W. H. Freeman, 1989) in place of a mere manual. But StatView Student covers a great middle ground of standard statistics, communicates directly with the professional versions of StatView and SuperANOVA, and should be available to students at about half the retail list price. It's highly evolved, bug-free, and includes enough advanced features to be useful even after you've finished your course work.

—Charles Seiter

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THE IMAGE GROUP
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THE X-12 INTRODUCTION

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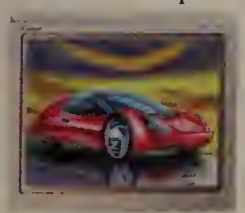
One of these proposals will be left in the dust.



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Sound-Annotation Software

READ MY LIPS 2.2

Pros: Interesting idea. **Cons:** Slow; convoluted interface; works with only six programs; buggy. **Company:** Praxitel. **Requires:** Mac Plus; System 6.0; microphone or MacRecorder. Recommended: System 6.0.7. **List price:** $119.

A neat, Star-Trekky microphone comes with every Macintosh LC and IIsi. Until recently, about all you could do with it was record cool beep sounds. The voice-annotation revolution hasn't exactly been Speedy Gonzales.

Nor has it picked up its pace much with the arrival of Read My Lips, a control panel that lets you attach sound files to some documents.

Too Much Interface

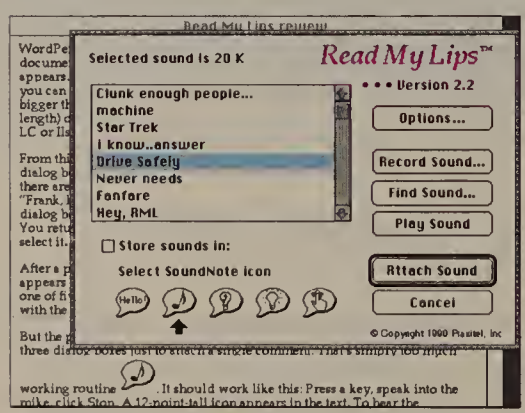
Read My Lips works with FileMaker Pro, Persuasion, QuarkXPress, Inspiration, PageMaker, PowerPoint, and most word processors (but not WriteNow). To attach a sound to a document, you press the ⌘-\ combination; a main dialog box appears. If you have an Apple microphone–equipped Mac (and System 6.0.7 or later), you can select one of three sound-quality settings (the better the sound, the bigger the file), and save the sound to memory (thus limiting its length) or disk.

From the main dialog box, you click on Record Sound to produce a second dialog box. It's the same one you see in System 6.0.7's Sound control panel—there are buttons labeled Record, Stop, Pause, and Play. Click on Record, say "Frank, here are the sales figures," click on Stop, then on Save. Now a *third* dialog box appears, where you have to give the sound a name. Click on Done. You return to the main dialog box, where you see a list of sounds. Click on one to select it. Click on Attach Sound. You return to your document, where a musical note icon (or sound icon of your choice) appears at the insertion point.

The point is that, at the very minimum, it's taken you eight clicks and three dialog boxes just to attach a single comment. That's simply too much trouble.

Here's another problem: To play a sound, you have to select the icon and press the ⌘-\ combination. But if you select a space on either side of the icon, or if you select with PageMaker's text tool (and not the arrow), you lose control of the Mac for a few seconds, but no sound plays.

Once you do get the sound to play, a dialog box appears with a message about how to interrupt the playback, obscuring the very text you're trying to read! Once the sound has finished playing, you wait for a few seconds (or, on an SE, Classic, or Plus, *many* seconds) before you can return to viewing your document.



Monologue Box When you record (or select) a sound and click on Attach Sound, you wait for a few moments, then whichever sound icon you've selected appears in your text (back window). Later, the user can select the icon and play your recorded sound. Unfortunately, that jumbo icon wreaks havoc with your line spacing.

The Bright Side

There are a few nice aspects to Read My Lips. You do get a good glimpse of the way voice annotation *could* work. You can transfer sounds between documents by copying and pasting the sound icons. You can store sound files on disk (instead of inflating the text document itself). And there's a play-only version included, which you can distribute to others.

Read My Lips is a great idea with ten times too much interface. The nested dialog boxes have to go. And there are bugs in version 2.2—buttons that should be dimmed when not available, and so on. Hey, Praxitel: you're onto a good idea with Read My Lips. But now read mine: simpler and faster in the next version, OK?

—David Pogue

See **Where to Buy** *for contact information.*

Animated Talking Utility

AT YOUR SERVICE 1.0

Pros: Unique; thoughtful implementation; hints at possible future human-computer interaction. **Cons:** Novelty wears off quickly; limited usefulness; messages not customizable. **Company:** Bright Star. **Requires:** Mac Plus; 2MB of RAM; hard drive; System 6.0.4 (6.0.7 for sound input). **List price:** $59.95.

"Hi there. Welcome to Macintosh!" These are the first words you hear after installing At Your Service, a unique, animated, talkative online companion from Bright Star. They're spoken by Phil, a painstakingly friendly *agent*, or computerized butler. As you work, his face pops up from time to time like a corporate Talking Moose, alerting you to arriving E-mail or bidding you farewell when you shut down.

Having Your Phil

So who's this Phil? It matters, since your reaction to his clean-shaven, ethnically indeterminate mug is critical to the program's success. It would have been much nicer if you had a choice of faces to look at all day, of course; a woman perhaps, or somebody less thirtysomething, or just somebody different. And because At Your Service is built on the technology used in Bright Star's first agent-based program, InterFACE, Phil suffers from the same bodily stiffness and eyebrow-freeze syndrome as other InterFACE agents. (InterFACE creates animation on the fly by cycling rapidly through only 32 facial images,

(continues)

At Your Service Eternally polite, never tardy, the digitized color version of Phil the On-Screen Servant pops up with a reminder at a critical moment. With the right equipment, you can make him go away by saying "Thank you" into a microphone.

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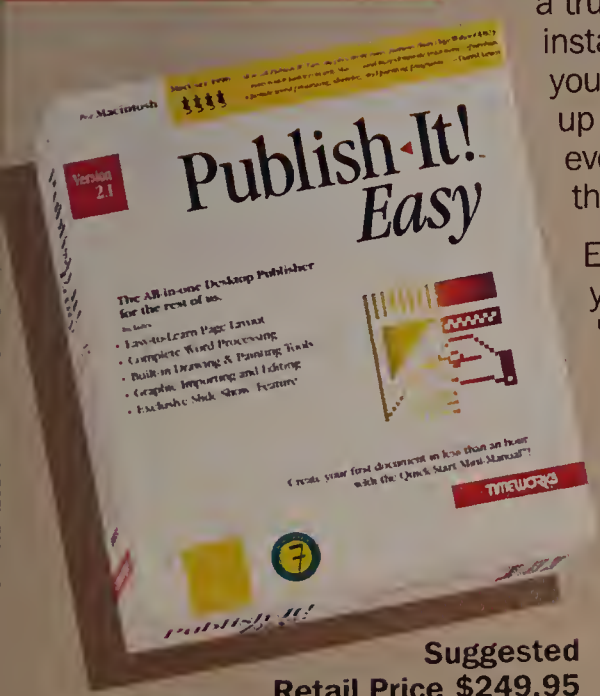
Plus Publish·It! *Easy* Version 2.1 has tons of goodies thrown in to make this a truly extraordinary program. For instance, thumbnail editing lets you look at your entire document, up to 100 pages at a time, and even make changes while in thumbnail mode.



Experiment all you want with your document's design, *Easy*'s "What If" features lets you alter page elements instantly.

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* Not compatible with Macintosh 128K or 512K machines.

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Circle 206 on reader service card

each showing a model pronouncing a different letter or sound [*Macworld, Reviews,* October 1990].) Phil is fascinating to watch, especially when he blinks, glances around, or smiles, but the motion still smacks of TV's computer-generated Max Headroom. There's a certain jerkiness to his mouth movements, particularly when his lips jump from, say, a *W* position to an *S* (since there are no in-between frames of animation).

Phil's voice is a digitized recording of an actual person, whose readings are exactly right: natural, neither too singsongy nor too flat. Wordings have also been chosen with incredible care; Phil's limited utterances are always articulate and to the point.

All right, so what does this guy actually do? He has six functions: to greet you when you turn on the Mac; to pop up at an appointed time with a reminder; to suggest that it's time for a work break; to alert you when a QuickMail or a Microsoft Mail message has arrived; to tell you what Macintosh model, installed memory, and hard drive capacity you have (in the unlikely event that you somehow forget); and to explain all of this in case you don't quite get it.

The reminder system is akin to Smart Alarms or Alarming Events: using the desk accessory, you type in an event, its corresponding time, and a category designation such as Lunch, Meeting, To Do, Phone, Deadline, and so on. Then, at the designated moment, Phil appears and says, "Pardon me: you have a deadline to meet," or something likewise appropriate. Phil's phrases don't allow him to be more specific about the deadline, so he comes attached to a dialog box that displays whatever text you originally entered ("Steve's birthday" or whatever). The reminder feature is by far Phil's most useful and practical offering. But you cannot schedule reminders for, say, the third Thursday of the month, cannot print out your list of events, cannot display them on a calendar, and so on.

Service Hero?

The interface is clever and effective. You have plenty of control over the various options. The manual is superb: a model of clear writing and effective organization. There's even one truly breakthrough feature: when Phil pops up with a reminder or a message, you can actually dismiss him and his dialog box by saying "Thank you"—yes, ladies and gentlemen, you've just had a spoken chat with your computer. (Of course, this works only if you have a MacRecorder or another microphone connected to the Mac. [With System 7, this feature also requires special driver software for the MacRecorder, available from Farallon.] And truth to tell, it really does not matter whether you say "Thank you" or "Get lost" or "Feta cheese"; the program simply listens for a sound of the length and volume you programmed. Incidentally, while we're in parentheses: Version 1.0 crashes the system if Suitcase II 1.2.10 is installed.)

Of the six functions, only the reminders, the E-mail notification, and the work-break feature seem worth using. And despite Phil's best efforts to vary his wording from appearance to appearance, even those features start to drive you a little nuts after the 50th repetition.

Ultimately, you realize that there are better, dedicated programs available for each of Phil's functions. You wonder what in particular is gained by adding an animated talking head to the proceedings, other than a little novelty; the answer may well be not much.—**David Pogue**

See **Where to Buy** *for contact information.*

Tile Game

TESSERAE 1.04

Pros: Strategically engrossing; aesthetically attractive; no pain-and-strain syndrome; original. **Cons:** Long learning curve. **Company:** Inline Design. **Requires:** Mac Plus; System 6.0.5. **List price:** $49.95.

It took me a long, *long* time to figure out how to play Tesserae—but it held my interest through the learning process, and it was worth it. It's a challenging and aesthetically appealing game, and unlike any other that I know of.

At first glance Tesserae looks a bit like a Shanghai or an Ishido, but it's not. You click on tiles to jump them over other tiles, according to a scheme that might seem simple but proves quite complex. When you jump over a tile, it disappears. The object *is* simple—clear the board. After a few games—well, maybe a few hundred games—you get a grasp of how certain combinations of tiles at certain intervals work, and others don't.

Tiles The green tile is a double (made by hopping a blue onto a yellow), the purple is another double, and the gray one is a triple. Note that it's wise to start from the corners and edges and work inward.

There are three classes of tiles—single, double, and triple; and three patterns—square (blue), circle (red), and cross (yellow). In Beginner mode, you start with a simple arrangement and all single tiles. After you have mastered that mode—which took me a few months—you can move on to Intermediate, in which the board has several double tiles scattered among the single tiles. After Intermediate comes Advanced (which adds many triple tiles). Each level can be played on any one of nine board layouts, ranging from the easy rectangle to a fiendishly challenging X shape.

No Pain

One of my favorite things about playing Tesserae is that it doesn't hurt. (Computer game–induced repetitive strain injuries can be very painful indeed, as any addicted game player will attest.) Tesserae's scoring does not depend on speed, so you can take your time, and you just have to click—no dragging. You can switch hands, or even click with your thumb, to avoid RSI.

I highly recommend Tesserae. It's a good game, and (perhaps one of its best features) it totally confounds casual kibitzers.—**Felicity O'Meara**

See **Where to Buy** *for contact information.*

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Music-Theory Drills

MIBAC MUSIC LESSONS 1.01

Pros: Wide variety of music-reading and ear-training exercises; excellent Help function and MIDI support. **Cons:** No chord-building drills. **Company:** MiBAC Music Software. **Requires:** Mac Plus; second disk drive; System 6.0. **List price:** $89.

The Macintosh has long been the computer of choice for applications for professional musicians, and a new package from MiBAC promises to make it a valuable learning tool for beginning and intermediate musicians as well. MiBAC Music Lessons is a set of automated drills that help train your ear and your eye to recognize pitches, intervals, scales, and modes. With its ear-training exercises, MIDI support, and a Help menu that doubles as a miniature music-theory reference, even experienced musicians may find Music Lessons useful.

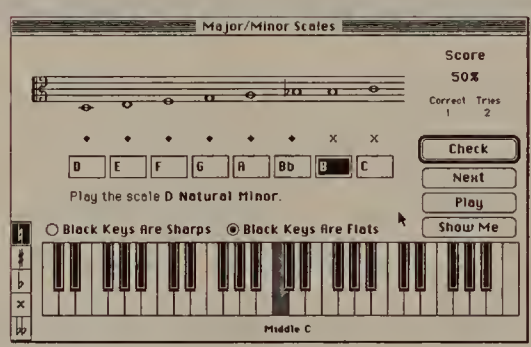
MiBAC to School

Most of Music Lessons' nine drills share a similar screen layout: a single staff at the top, a musical keyboard at the bottom, and a scoreboard that tracks your progress (see "Scales Drill"). In some drills, you respond to questions by clicking on notes on the musical keyboard, which produces a respectable sampled piano sound; in other exercises you choose answers by clicking on radio buttons. If you have a MIDI interface and instruments, you can use a synthesizer or sampler instead of the built-in piano sound and respond to many of the questions by playing your MIDI keyboard, guitar controller, wind-instrument synthesizer, or other instrument. Music Lessons even works under Apple's MIDI Manager, providing a single input-output port, which users who have MacProteus or SampleCell boards in their Macintosh II's will appreciate.

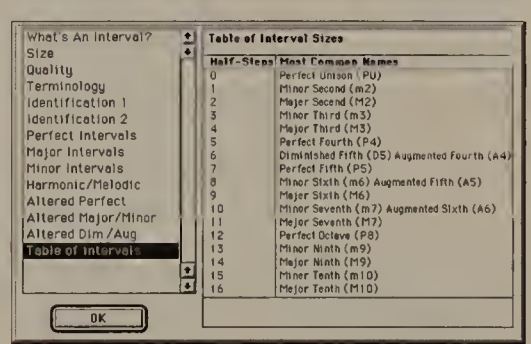
The Drill Bit

For each drill, you choose a skill level from the pull-down menu; so you can decide, for instance, whether or not to enable accidentals and ledger lines in the note-naming drill. The most basic drill, Note Names, plays a series of four pitches and shows them on the staff, and you respond by either playing the musical keyboard or typing the note names. You can also use this drill as an ear-training exercise, if you don't look at the staff until you've responded to the question. The Circle of Fifths drill asks you to play the notes of the circle of fifths for major and minor sharp and flat keys, and to play the order of sharps and flats as they occur in key signatures. The Key Signatures drill presents a staff with a clef and sharps or flats and asks you to identify the key indicated. The Major and Minor Scales, Modes, and Jazz Scales drills each ask you to play the notes of a given scale or mode. The Play button allows you to hear the notes of the scale or mode without seeing them, so you can do a little ear-training here as well.

The next three drills consist of multiple-choice questions. Scale Degrees shows you a clef and a key signature and names a context (such as Melodic Minor), and asks you to name the scale degree of a given pitch; you choose answers, such as Supertonic and Mediant, with radio buttons or ⌘-*key* combinations. The Intervals drill plays two notes and shows them on an on-screen staff, and you identify the interval between the two pitches. If you use MIDI instruments as sound sources, you can have the two pitches sent to different channels and have the interval played arpeggiated, together, or both (otherwise, you're restricted by the Mac's inability to play more than one note at a time). The only rhythm drill, Note/Rest Durations, asks you to determine the number of beats a given note value has in a measure of a given time signature. You can restrict the time signatures you're tested on, and choose to view notes, rests, or both, but that's about it. In addition there are two ear-training exercises, Scales and Intervals, which play you an example and ask you to identify it.



Scales Drill Music Lessons' drills pose questions via the staff or text, and you respond by playing the on-screen musical keyboard or by typing note names. As you play each note, it appears on the staff.



Reference Desk Music Lessons has an excellent Help function, which can double as a basic music-theory reference guide. It contains useful information like the table of intervals shown above.

Not Just for Beginners

For each drill, Music Lessons' Help module provides up to 16 pages of clear explanations of the basics of music theory. There are tables of interval names, whole-step/half-step diagrams of scales, and a lot of other information that is helpful to have on hand, even if you're no longer a student. Songwriters and recording-studio technicians alike will appreciate having an excellent though basic music reference guide available under MultiFinder. Even seasoned musicians may be surprised at some of the scales they've forgotten or modes they never learned.

MiBAC's package is well executed and complete and should prove valuable to a wide variety of users. Its MIDI support is up-to-date, and it runs on any Mac from a Plus on up. It would be nice to see a second-semester version of Music Lessons that took advantage of MIDI's polyphonic capabilities so you could learn to identify and build complex chords, and with more rhythm drills that would help you learn to add rhythmic values and count out patterns. Even though it's only a first-semester course, MiBAC's Music Lessons gets an A plus.

—Charles Clouser

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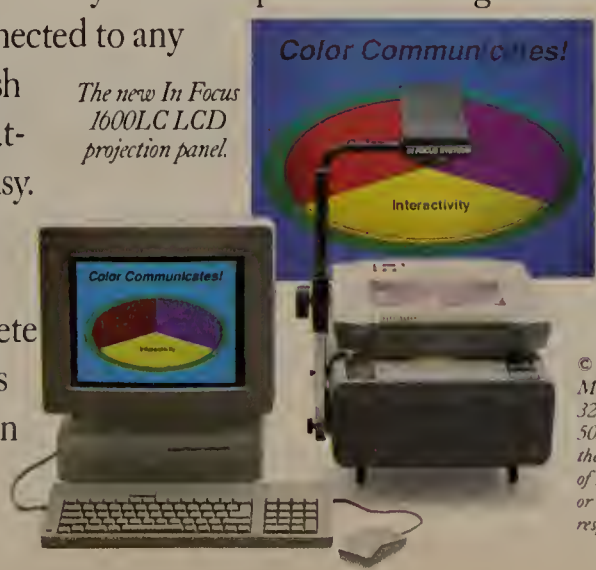

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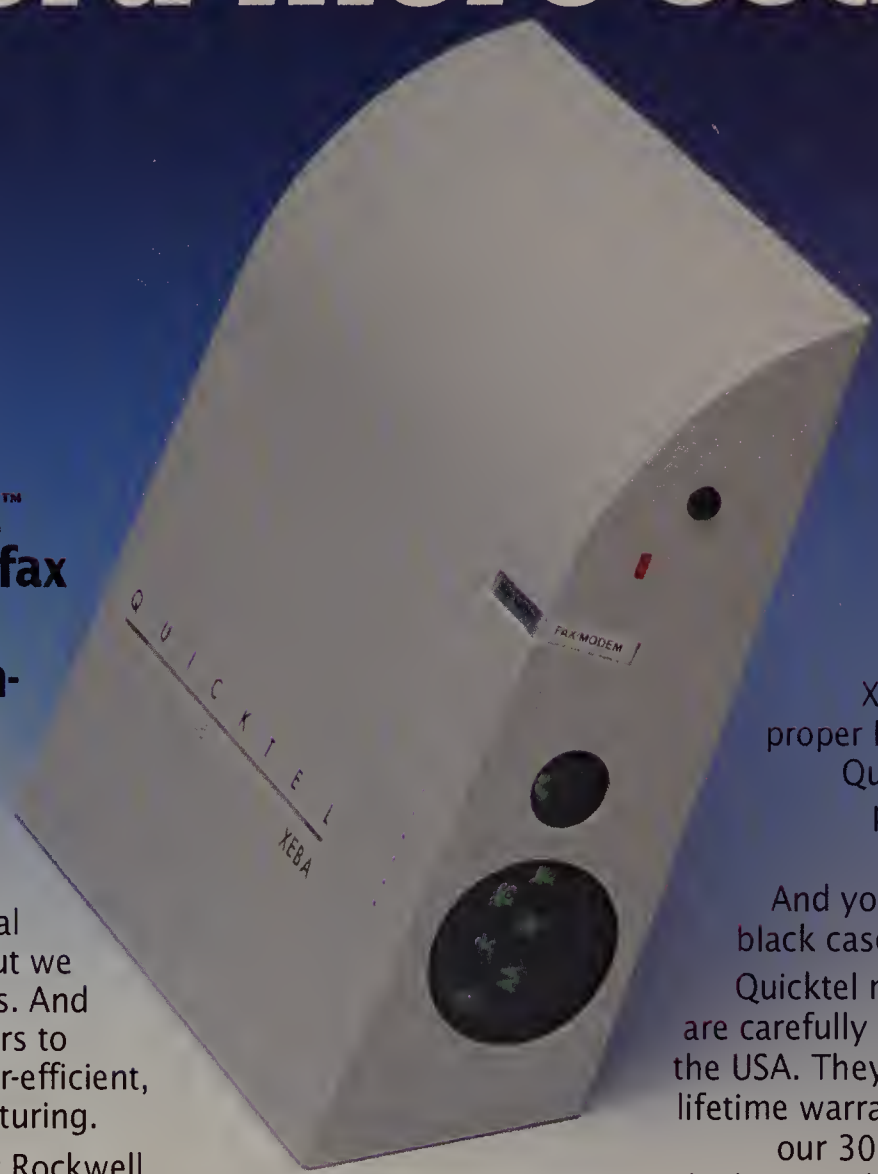

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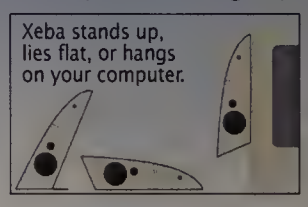

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Circle 93 on reader service card

Mac-to-IBM Mainframe Communications

SIMMAC 3.1

Pros: Scripts can be assigned to buttons and graphics on screen; supports both modem and coaxial connections. **Cons:** Does not support standard IBM IND$FILE file-transfer software; script-editing window cannot be enlarged. **Company:** Simware. **Requires:** Mac Plus; Hayes-compatible modem (for asynchronous connection) or protocolconverter, coax board, or Tri-Data gateway; SimXfer software for file transfers. **List price:** $395.

The hardware necessary for connecting Macs to IBM mainframes includes a variety of choices—you can use modems with protocol converters, interface boards with coax cables, or gateways with coax or token ring cables. Now you have a software choice. Putting a Mac interface on a communications session with an IBM mainframe is a fairly new idea.

The original SimMac offered scripting capabilities that could be used with a mainframe session, provided communications occurred over a modem, and Simware's software was also running on the mainframe. Simware has greatly expanded both the scripting and communications capabilities of SimMac.

Can We Talk?

The SimMac software comes in two flavors: SimMac Async for asynchronous (modem) connections only, and SimMac Master, which includes both the async communications and synchronous communications options. I tested SimMac Master with a Hayes V-Series 9600-bps modem as well as with Digital Communications Associates (DCA) MacIrma and Avatar MacMainFrame coax boards.

SimMac communicates with a mainframe via a modem, but to transfer files you need to install another Simware product, Sim3278, on the mainframe.

Version 3.1 of SimMac allows you to use a coax interface board, a gateway, or a protocol converter to communicate with the mainframe. SimMac 3.1 supports Apple's Coax/Twinax Card, DCA's MacIrma, and Avatar's MacMainFrame boards. You can also use SimMac with Tri-Data Systems' Netway 1000AEX and 2000 gateways, or with the old AppleLine protocol converter. Other supported protocol converters include: IBM 3708, IBM 7171, Renew TMS, and SimVT100.

SimMac 3.1 allows you to define a more graphical interface for IBM communications. Rather than deal with the typical 24-line-by-80- or 132-character display of an IBM3278 terminal, you can display pictures, pop-up menus, buttons, and check boxes to control the Mac's communications with a mainframe.

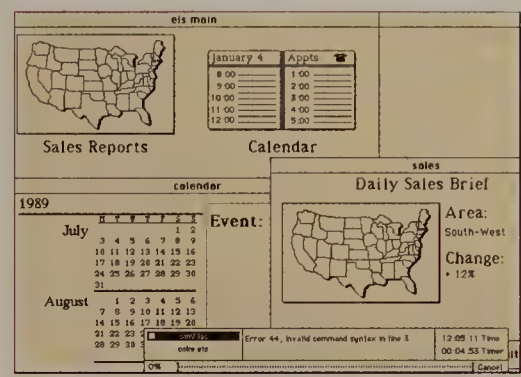
You can use these graphic elements to put together a graphical interface to IBM mainframe communications, with separate windows for different activities, such as E-mail and sales projections (see "Is It Really a Mainframe?"). Both modal windows (dialog boxes) and nonmodal windows (the movable, resizable windows) can be defined.

Scripts, Anyone?

SimMac includes an extensive scripting language that can be compiled for speed and compactness. As in earlier versions, scripts can be assigned to buttons that appear at the bottom of a session's display window on the Mac. Version 3.1 lets you assign scripts to other buttons and graphical items anywhere in a window. A special class of scripts, called AutoRun, can be executed when you open or close a session. For example, you might design an AutoRun script that prints a session log when you log off.

SimMac's built-in script editor includes an online help facility and a scrolling list of all allowed scripting terms. Normal cut-and-paste operations are supported in the editor, along with a limited Find facility. Although the editor includes both horizontal and vertical scroll bars for viewing a script; SimMac's editor window cannot be enlarged.

SimMac offers a significant advantage over other products. Scripts written for SimMac can also be used with Simware's sister product for MS-DOS computers, SimPC. This capability makes it easier for a corporation to maintain one product over multiple computing platforms.



Is It Really a Mainframe? SimMac can present an entirely graphical interface for the user communicating with an IBM mainframe. For example, the "eis main" window offers a choice of reviewing a calendar [misspelled *calender*], viewing the sales reports, or sending E-mail (behind the calendar window). Clicking on the appropriate image opens a new window—for example, clicking on the map labeled Sales Reports opened the window named "sales." Also shown at the bottom of the screen is SimMac's status bar.

Moving Data

SimMac has a disadvantage in handling file transfers. Rather than depending on IBM's standard IND$FILE file-transfer software, which is installed on most IBM systems, SimMac requires that one of Simware's file-transfer packages be installed on the mainframe. Simware offers two such packages, SimXfer and Sim3278 (the file-transfer portion is called Formac). SimXfer is designed for use with 3270 emulation, such as through a coax interface board or protocol converter, while Sim3278 is designed to handle asynchronous (modem) connections.

More Power to the User

SimMac lets you create scripts of common actions and assign those scripts to buttons. Even if you choose to stay with the regular IBM3278 interface, the script buttons make communications easier. And SimMac 3.1 lets you add graphics and other Mac interface items (check boxes and pop-up menus, for instance) to communications sessions. You don't have to worry about remembering the syntax of an IBM command, or which command you need. If you're an occasional user of IBM mainframes, or support a lot of users who are, I recommend using SimMac.—**Dave Kosiur**

See **Where to Buy** *for contact information.*

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Alternative Input Devices

MOUSEPENMAC

Pros: Comfortable and light; intuitive handling when used for illustration or graphics programs. **Cons:** Flimsy construction; bothersome to pick up and put down when moving from keyboard to mouse.
Company: Appoint. **List price:** $99.

MVP MOUSE

Pros: Efficient and comfortable cursor control; programmable tracking speeds; easy to assign new commands to mouse buttons. **Cons:** None.
Company: Curtis Manufacturing Company.
List price: $149.95; optional foot switch $29.95.

It's impossible to achieve point-and-click simplicity without having something to point *with*. The basic mouse comes with a single nonprogrammable button and requires about one foot square of desk space to move the cursor around the screen. But in recent years a number of alternative input devices have been introduced that offer specialized features such as programmable buttons, reduced working-area requirements, turbo-speed action, and unusual shapes that are supposedly more comfortable, more efficient, or simply more stylish than your run-of-the-mill mouse.

MVP Mouse

Trackballs are one of the most popular alternative devices because they require less working space than a mouse. You move the cursor by rotating a smooth ball that sits on a set of stationary sensor rollers. Depending on how quick or agile your fingers are, a trackball can move the cursor as fast as or faster than a mouse.

The MVP Mouse is one of the best-designed trackballs on the market. It's constructed of durable material, it's easy and comfortable to use, and the action of the ball is smooth, fast, and efficient. Couple the great design with an array of programmable features, and you've got a great alternative to a traditional mouse.

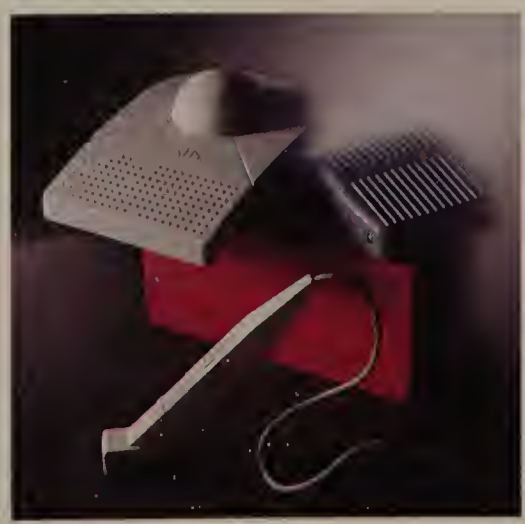
One of the recurring problems with using a trackball is that your hand gets tired because there's no support for the wrist. The MVP Mouse solves this problem with a plastic base that has a long, curved extension with a rough surface where you rest your wrist. I found that I could work for hours using the MVP Mouse without much fatigue.

The MVP Mouse really excels in its programmable features, which you access through the Control Panel. After installing the trackball's software in the System Folder, you click on the trackball icon in the Control Panel to customize the MVP Mouse.

Programmable buttons wrap around the trackball on three sides—top, right, and left. The three large buttons can be programmed to perform almost any command: click, click-lock, delete, return, shift, tab, undo, cut, copy, paste, or any ⌘-*key* combination. By adding an optional foot switch, you can have a fourth programmable button.

I found the programmable functions extremely powerful and convenient, especially for repetitive functions such as cutting and pasting in a large document. By using the foot switch as a shift key, for example, I was able to perform ⌘-shift-*key* commands quickly and easily. It's also easy to customize the MVP Mouse for left- or right-handed action because any command can be assigned to any button on the pad.

Other programmable functions are trackball speed and double-click speed. If you need ultraprecise cursor control for drawing, for example, you can set the trackball speed to move the cursor only a tiny bit no matter how fast you move the trackball. Or you can send your cursor shooting across the screen with almost no effort, by setting your trackball speed to the highest levels. I suppose this comes in handy for specialized users, but for the vast majority of users, the default speeds are just fine—and, in fact, I found the differences in cursor control not quite as great as the manual suggests.



MARK JOHANN

MVP Mouse and MousePenMac (with foot switch)

MousePenMac

The MousePenMac is a mouse designed to vaguely resemble a pen. The concept is that the pen is more familiar, smaller, and lighter, and consequently is much easier to use, than a mouse or trackball.

It's an interesting idea, and I found it particularly useful for draw and illustration programs because it's more intuitive to draw with something the size and shape of a pen than with a standard mouse or a trackball.

I also liked the position of the main mouse button, since it rests conveniently beneath your index finger and is easy to click. A second button above the main one changes the mouse speed from the normal default to the slower, precision mode. You cannot change or customize the function of either button.

There are some major drawbacks to the MousePenMac. First of all, in an attempt to make the mouse as light as a pen, Appoint made the mouse out of flimsy materials—so flimsy, in fact, that it feels like a toy rather than something you would use as a permanent substitute for a mouse.

Also, the cursor control is jumpy and occasionally sticks, especially if you are not pressing down firmly. I found myself concentrating on keeping a constant pressure on the mouse instead of concentrating on the screen. You also must use the mouse on a textured surface such as cloth or paper—if you use it on any surface that is too smooth, you have problems moving the cursor at all.

The MousePenMac includes a "holder," a cheap-looking piece of wood with a circle drilled out of it. Throw it out. The holder can't be used during normal work because it requires glancing down every time you

(continues)

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NEC

put down or pick up the mouse. Furthermore, the holder looks silly when the mouse is in the holder because of the wire that droops down to the computer.

I found the MousePenMac to be an interesting device that could be useful for someone who does a lot of design and drawing, but considering the steep price of $129, I would expect a bit more structural substance. Compared with the MVP Mouse, which sports a price tag of only $20 more, the MousePenMac comes up short in both performance and design.—**Mike Dashe**

See **Where to Buy** *for contact information.*

Organic Chemistry Expert System

BEAKER 2.0

Pros: Cheaper than most textbooks; easy to use; informative; includes analytical-computation and reaction schemes. **Cons:** Minor print bug. **Company:** Brooks/Cole Publishing Company. **Requires:** Mac 512K. **List price:** $29.95; separate Lab Package $100; network license $50 plus $10 per CPU.

Under no circumstances should you consider taking an organic chemistry course in college without a copy of Beaker. It's that simple. You will find this program to be more informative and helpful, on a great variety of topics, than most textbooks or classroom lectures. Since organic chemistry is typically the subject that serves to make the first cut of premeds and other health-science majors, Beaker may be the last best hope of, say, the predental major who has been dreading organic as a career obstacle since late in high school.

Alkyl to Xylene

Beaker contains a collection of features that would have represented tens of thousands of dollars' worth of minicomputer software as recently as 1985. Starting with the basics, Beaker offers easy-to-use molecule-drawing facilities that also translate drawings into IUPAC names and names into drawings (see "Names and Pictures"). Typing in the IUPAC name and seeing the resulting molecular drawing is a good way to check your understanding of the conventions.

The program handles rings, fused rings, and typical organometallic reagents with ease, and redraws your own mouse-drawn structures to standardize bond angles and lengths. In an hour or so, you can draw and save in separate files enough compounds to give yourself an extensive molecular database for further exploration. Beaker's manual and online help are better than average as well.

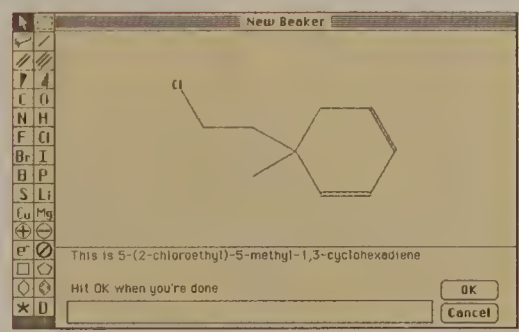
The program gives orbital hybridization data for any atom, shows resonance structures, and displays stereochemistry using either wedge-and-dotted-line bonds or Newman projections. It does these things, by the way, as fast as a screen refresh; this relatively compact program (a 228K application) exhibits no measurable computation lag, even on a Macintosh Plus.

Beaker also draws connectivity isomers from molecular formulas. This feature produced the only glitch: for some reason the structures in the isomer display windows wouldn't print directly, although structures in the main molecule-drawing window printed beautifully. All structures (even those in the ill-fated isomer view) could be copied and pasted into standard word processors for professional-looking lab reports.

Good Reactions

The "structure lab" is just the beginning. After drawing molecules of interest, a well-stocked dialog box lets you pick out solvents, conditions, and reagents (temperature, common oxidants and reductants, acids and bases), and Beaker's expert systems will predict a reaction. If you're a research chemist you probably won't find these predictions valuable (the built-in reaction expert system is clearly working from a small set of rules), but they do correspond to the reaction set you would find in familiar undergraduate organic chemistry textbooks.

As an aid to learning the core repertoire of reaction schemes, the reaction predictions are already immensely helpful, but Beaker further



Names and Pictures You can give Beaker an IUPAC name and it will draw the compound, or draw the structure and ask for the name.

provides you with a step-by-step analysis of the reaction mechanism. Once more the program not only goes beyond what you would expect at this price, but it also delivers and reviews precisely the information you need to know to get a decent grade in this subject.

The Whole Spectrum

Extending the program's collection of goodies to the point of delirium, Beaker calculates the first-order proton nuclear magnetic resonance spectrum of any compound you can draw, and displays it in a screen that looks like the output of a routine-use 60MHz NMR spectrometer. The idea here is that you can use the spectrum (which you can probably obtain in a modern lab course) in combination with other analytical data (such as elemental analysis or unsaturation data) to determine the structure of organic-lab unknown compounds. Beaker, ever helpful, also integrates the peaks in the computed spectrum for additional assistance in structure determination.

A Distillation

On one level, Beaker is the most thorough automated course drill for organic chemistry yet devised, and on another level it's the least expensive piece of working chemistry software ever offered. In a world where a sweatshirt sporting the name of your college costs 20 bucks, Beaker rates as a sensational bargain, and for many students an investment in survival. Brooks/Cole deserves applause not only for its philanthropic pricing policy on this software, but also for releasing a tutorial program as well-organized and complete as Beaker.
—**Charles Seiter**

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Educational Circuit-Modeling Program

ELECTRONIC WORKBENCH 1.5

Pros: Both analog and digital modules; careful explanation of circuit models; self-explanatory interface. **Cons:** Limited set of analog components; slow for large models. **Company:** Interactive Image Technologies. **Requires:** Mac Plus; 800K drive. **List price:** $299 (educational discounts available).

The best way to learn about electronics is to build circuits. In an electronics class, this typically means wiring up circuits on a Heathkit breadboard and testing them under a variety of conditions. The circuit components aren't expensive, and neither are breadboards, but to understand circuit behavior properly requires test equipment that's too expensive for individual student workstations. Oscilloscopes, signal generators, and spectrum analyzers for analog circuits, and logic analyzers and word generators for digital circuits, represent a dismaying investment at 20 copies per classroom.

Fortunately, the Macintosh can simulate not only humble circuit components but also fancy test instruments, giving students a chance to model circuits before stringing together the real thing that can actually smoke and spark.

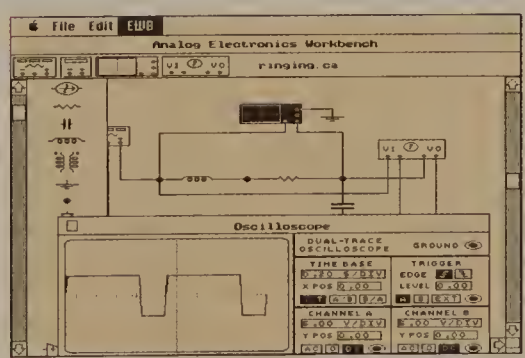
Electronic Workbench (EWB), from Canada's Interactive Image Technologies, is an educational electronics-simulation program that includes both analog and digital modules at a reasonable price. It's not intended to compete with professional engineering circuit simulators, and it can't. EWB does not offer National Instruments' LabView's complete range of instrument simulations, and it offers fewer components than the electrical-engineering package for Extend. But EWB offers enough features to replicate most circuits in a first-year electronics text, and for students it's a bargain (it was a reasonable deal at its old price of $695). Let's look closer.

Low-Voltage Excitement

The analog module presents a parts bin in a palette at the left side of the window, and a set of instruments at the top (see "Scope It Out"). To make a circuit, you drag a few connection points and components from the palette, connect them as you wish, use the signal generator or other source for circuit input, and hook up the simulated dual-channel oscilloscope at various test points. Selecting Start Simulation from the EWB menu activates the circuit, and you can stop the simulation at any time with a mouse click.

EWB does a very good job on some difficult points: the user can control all parameters in the transistor model (Ebers-Moll), specify details of model components (op-amps and transformers are good examples), and set the time base of the simulation from microseconds to hours. There's a respectable Help facility and a careful explanation of the way Electronic Workbench handles the matrix math underlying the simulation. Some additional interface amenities (close boxes, multiple open windows with Copy and Paste) would improve the program, but because selected elements in a circuit can be named and saved, there's a workaround for most operations.

One feature that lets Electronic Workbench transcend apparent limitations—such as the somewhat limited parts bin—is a macro facility that enables you to define sections of circuits as macros, label them, and place them in the parts bin for future use. Effectively, you can make up custom integrated circuits that plug into other simulations as standard parts.



Scope It Out The oscilloscope in this analog simulation never has triggering problems but is otherwise realistic enough to do useful circuit analysis. Electronic Workbench is distinguished particularly by the quality of its simulated test instruments.

Nimble Digits

While no analog simulation can mimic the thrilling aroma of the fried power transistors you can get from your first real high-voltage circuit, a digital simulation is more faithful to its hardware equivalent, barring power-supply droop or lightning strikes. This is true, at least, for fairly simple circuits (fewer than 200 gates), which is the educational domain of this program. Like its analog counterpart, digital EWB gives the student a parts bin and instruments; the parts bin contains the expected gates (AND, OR, XOR, NOT, NAND, and NOR), flip-flops, a half-adder, and seven-segment displays. The instruments for the digital section are both useful and sophisticated: the word generator can hold sixteen 8-bit words for circuit input, the 8-channel logic analyzer can be set to trigger on any word pattern, and the truth table instrument can generate a circuit itself. Serious commercial circuits, albeit small, have been designed with less impressive equipment than what is provided with Electronic Workbench. Most electronics textbooks start out with the Karnaugh method for resolving a truth table into Boolean expressions; EWB uses the less familiar—more computer-friendly—Quine-McCluskey method, but it's a credit to EWB's pedagogical seriousness that the manual not only explains what method it uses (for purposes of simulation, you don't actually need to know) but also explains in usable detail how the method works.

Measuring Up

Electronic Workbench does a solid job for its intended users: students. Its price is attractive and its modest hardware requirements (it runs on a Classic, for example) are refreshing. The possible simulations cover most experiments a student is likely to encounter in a beginning electrical-engineering lab course or an electronics-for-scientists course. It's no secret that engineering education in the United States needs all the help it can get; perhaps it's a bit ironic that the best help it's getting at the moment happens to come from Toronto.

—Charles Seiter

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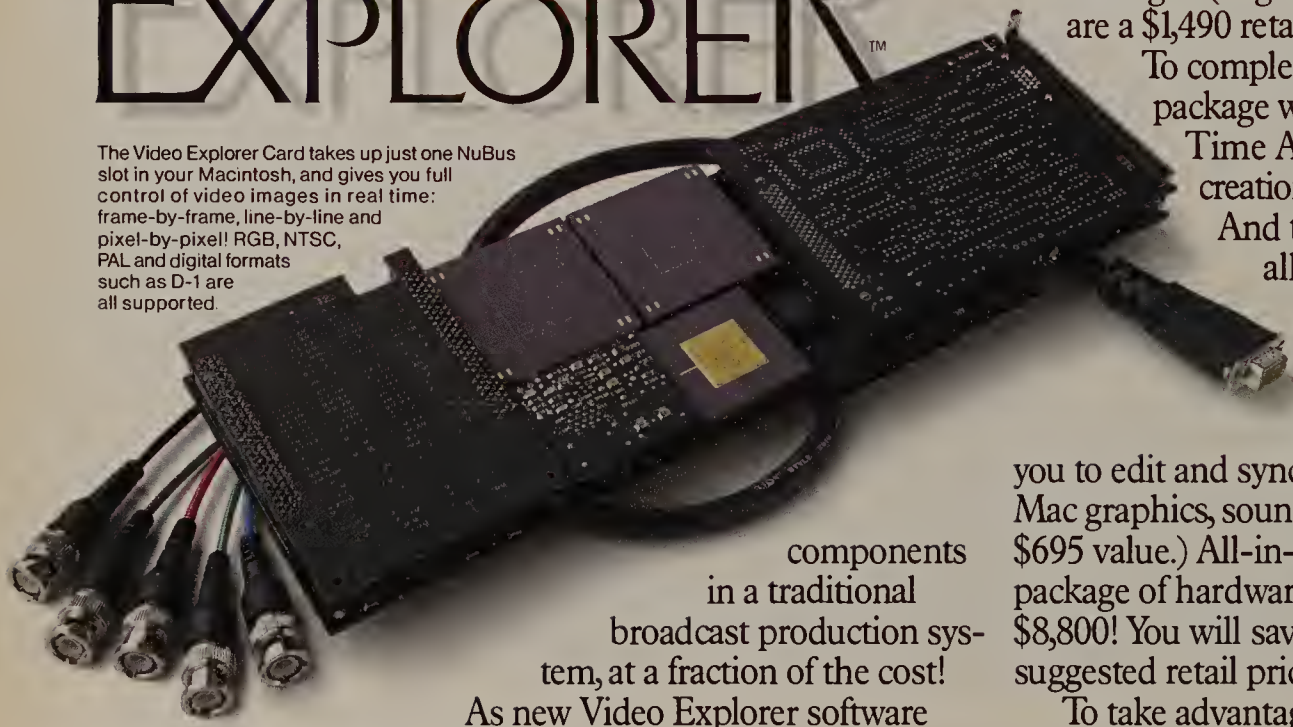

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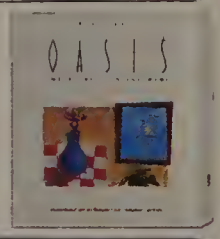

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Not Just a Bunch of Squares

CALENDAR AND REMINDER PROGRAMS AT A GLANCE

BY DAVID POGUE

Until they invent a Macintosh keyboard replacement that hooks up to your cerebral cortex, Mac calendar or date-book programs are only slight improvements over a little black appointment book. You still have to type in your appointments to reap the benefits of going electronic. Therefore, the best such programs are those that make it quick and easy to enter your things-to-do and people-to-see. (Everything here is System 7–compatible.)

Calendar 1.8

Would that all desk accessories were as intuitive and simple as this one (shareware, David Phillip Oster, $8). This DA's the granddaddy of calendar desk accessories, almost as old as the Mac itself . . . a minicalendar in a window. Click a day, and type your notes into the roomy text box below. Then, as the manual puts it, "Click a date to see that day's agenda. Arrow keys do reasonable things. The scroll bar works the way you are used to."

Calendar 1.8 has no pop-up reminders. But it's quick, attractive, and easier to use than any other calendar program on the market.

Calendar Creator 1.0

This application (Power Up Software Corporation, $69.95) doesn't really work as a day-by-day schedule book; it's just for displaying and printing calendars. You have a choice of canned but attractive formats: monthly, weekly, daily, and so on. Zoom in and out, enter appointments by double-clicking on a square, change the font of anything. Hypersocialites can make weekend-day squares extra-wide; clock-punchers can opt to lop off the weekend-day squares entirely.

Entering recurring events is a cinch, and printouts are handsome and WYSIWYG. Event descriptions can't exceed 40 characters, and there are no reminder features. But for display and printing, it's dandy.

CalendarMaker 3.0.1

CalendarMaker (CE Software, $49.95) is designed for generating calendar printouts (not for scheduling). It has a unique feature: you can paste in graphics.

On the other hand, CalendarMaker is horribly modal. You type in events, add graphics, and format your calendar in three different dialog boxes. You never get to see what you're building until you use the Preview command, where you can't edit anything. Only two formats are available: one- and two-month calendars.

MyTimeManager 3.5.8

This interesting application was evidently named and written by somebody with a broken spacebar. Even the commands lack spaces: JotToDo, InOut, GoTo.

The program (MacShack Enterprises, $79.95) is for both scheduling and remembering your events. As you add events to a day, more of its square becomes highlighted—a nifty busyness indicator. A special feature for networked System 7 users automatically finds a time slot when everybody is available.

But MyTimeManager demands too much effort to enter events. You must specify a starting and ending time for every single one—even when it makes no sense, such as "Claire's birthday." There are also some confusing elements in the event-entering window: buttons that do nothing, check boxes that produce error messages, no default (highlighted button), and so on. The feature set is great, but the interface Isn'tQuiteThereYet.

Alarming Events

A likable DA-INIT combination (CE Software, $129.95), Alarming Events is primarily an online reminder deal, although it can print a list of appointments. Click on a date on the calendar to display a slightly busy dialog box, where you enter an event. For each event, you're supposed to specify a category: To Do, Pop-up Alarm, and so on. To Do events are conveniently carried forward to subsequent days if you fail to take care of them at once.

(continues)

You can set up recurrent events (third Thursday of every month)—if you can figure out the interface.

Unfortunately, the manual doesn't bother telling you what some of the features are good for. But the pop-up reminders make up for it: they're attractive, discreet, and easy to dismiss or postpone.

Smart Alarms 3.0.7

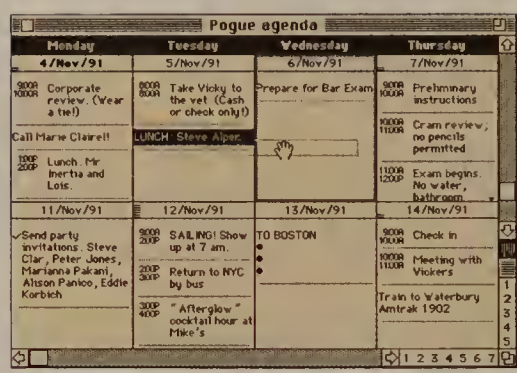
Smart Alarms (JAM Software, $125) is two desk accessories—Smart Alarms, for pop-up reminders, and Appointments, a clone of Calendar 1.8. Too bad they aren't well integrated: an event you enter in one DA doesn't automatically show up in the other. And weirdly enough, you can't open both DAs at once.

Otherwise, Smart Alarms works: recurrent events, advance-notice pop-ups, a remind-me-again-in-15-minutes feature, and other niceties are neatly laid out. Best feature: a very smart interface. Type the reminder, and hit the enter key once to save it and again to dismiss the DA. Worst feature: Smart Alarms dwells in a window with no close box, and it blanks out the entire menu bar (including the Apple menu). In MultiFinder or System 7, you can't get to any other application or DA until you quit Smart Alarms.

Rendezvous-Plus 3.02

Two awards for this application from PMC Telesystems ($249): Most Promising and Least Successful. The concept is an integrated date book, phone book, calendar, printing, and reminder system. Each window has different goodies. The Day window is ideal for daily planning, in 15-minute increments; the Month window is a full-size WYSIWYG calendar that displays things-to-do in each square; the Year Planner gives you an excellent overview; and the Phone Book automatically dials any name in any window. Printouts are hot.

But heavens, it's crude to use. You can't have both the Day and Month windows open at once—and you cannot get from one to the other without passing through the Year window. There's no font control anywhere. Only three of the windows are listed in a menu; you can only open the others by using nonintuitive keystroke or click sequences. Every window has its own file on the hard drive; some you have to save, others are saved automatically.



Little White Book AgentDA is an electronic daily agenda. To reschedule an appointment, just drag it to its new day, as shown.

AgentDA 1.1

Canadians have some darned good ideas. This one was to list your appointments as a daily agenda (Team-Building Technologies, $119). It's something like the other calendar programs, but it has much less propensity for chopping off your list of events when you've filled up the allotted square. The awesomely clever interface lets you move an event to a different day by dragging it. Double-click to enter or edit an event. Change the view from one day to seven days with one click. You can have more than one person's agenda open at once, making it easier to find open slots, and of course you can copy and paste events between open agendas. Pop-up alarms use your choice of sounds. Simple, slick, solid.

CalenDAr 1.1.2

Hey, neat. This little guy (from Psybron Systems, $49.95) is a teensy, highly graphic, super-intuitive online reminder DA (no printing). Not only can you use your own sounds to accompany various pop-up alarms, but you can also record new ones right into the program (MacRecorder or an Apple microphone is required).

The ™-happy manual desperately needs a proofreader, but its heart is in the right place. There's good online help, a clear recurrent-events interface, and finely tuned graphic design throughout. The only drags: the windows and fonts are almost *too* tiny. And you have to enter a time of day for everything. And the thing's only good until the year 99,999. Bummer.

Remember 2.2

This practical, colorful, indispensable shareware DA-INIT (Dave Warker, $20) is another online reminder system with agenda printing. Unique features: At start-up, Remember pops up a tidy list of everything you have scheduled to do today—or this week, or this month. (Most other programs can't show more than one day's events in the main display.) Entering events is intuitive and quick. And Remember introduces an amazing concept in event lists: word wrap. An event can be 255 characters, and you can read all of it (not true in Alarming Events, MyTimeManager, Calendar Creator, CalendarMaker, or CalenDAr). Pop-up alarms work great.

You can change the font, color, and size of *anything* in Remember: calendar numbers, background color and screen location of the pop-up reminders, text (you might want birthdays in blue, hot dates in red), and so on. You also specify the window size and placement; the program automatically adjusts the calendar's type size to fit the window.

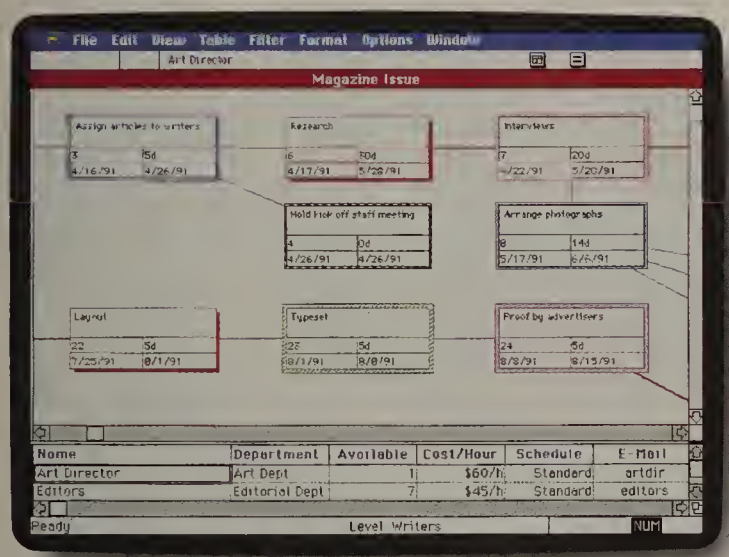
Easy Alarms 1.0

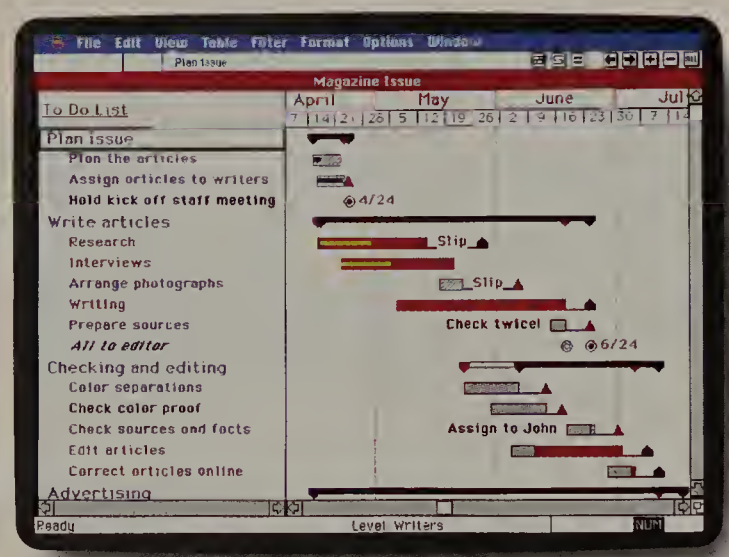
Where did this beaut come from? (Essential Software, evidently; $59.95.) Somebody took the color-customizability of Remember, the on-screen how-busy-am-I? calendar-square indicators of MyTimeManager, the pop-up reminder flexibility of Smart Alarms, the schedule-printout feature of Alarming Events, and the record-your-own-reminder-sound feature of CalenDAr, and wrapped them up into the slickest, cleanest package you can imagine. You can also send reminders, including voice messages (if you have recording capability), to anybody on the network. Easy Alarms also lets you make the calendar as big or as small as you like; you can't read the reminders within the squares, but you just click on a day to see a pop-up list of everything you have planned. A million other features, too. Nice work, gang. M

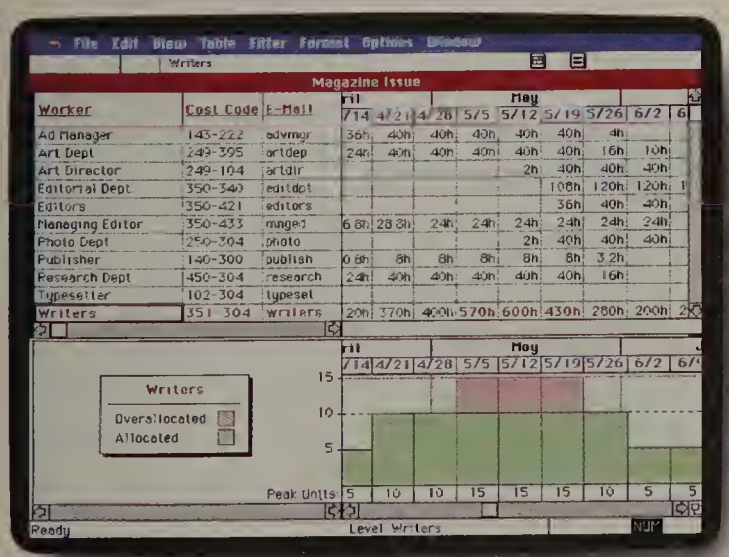
See* Where to Buy *for contact information.

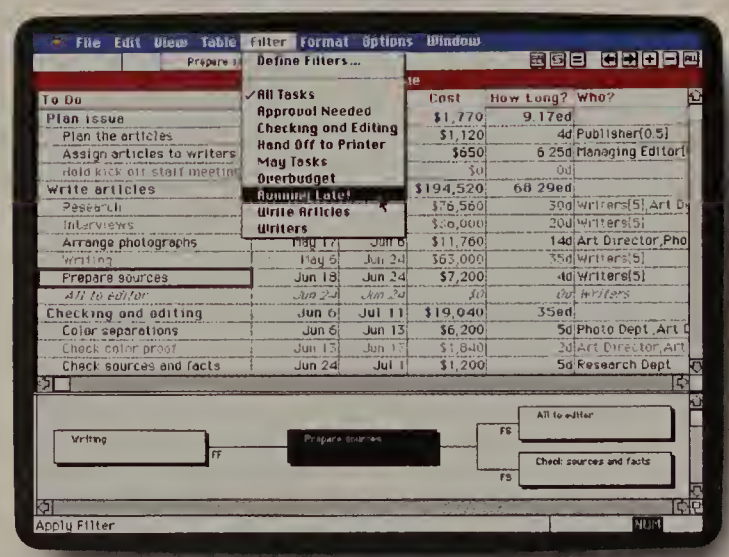
Contributing editor and efficiency nut David Pogue lives in Manhattan, where alarms are a way of life.

Before you start your next project, check your options.









New Microsoft® Project for the Macintosh® lets you enter and view your data just about any way you choose. Customize reports to your liking. And schedule resources across multiple projects with ease.

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Anti-Radiation Screens. What's The Difference?

Only One Does It All. NoRad.

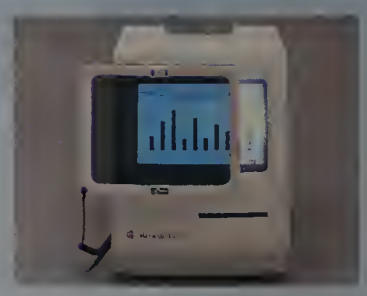
The **NoRad Shield** ™ is the only product that performs the tasks others try to do. Some claim to reduce ELF and VLF radiation, but fall short when test time arrives. Most of them cut down radiation in the electric field only. The NoRad Shield blocks the *entire* range of electric fields *and* the high range of magnetic fields.

- ***Electric Radiation*** *- Virtually the entire spectrum of electric field radiation is blocked by more than 99.99% - from ELF through VLF and beyond, up into the microwave range.*
- ***Magnetic Radiation*** *- Magnetic radiation is cut down by more than 50% in frequencies above 30 KHz, to levels no other screen manufacturer offers.*

Some screens reduce glare, but actually increase reflections because they're made of polished glass. The NoRad Shield's high-resolution screen tackles these two problems handily and also eliminates the static field which attracts dust to your monitor and propels dust to your skin and eyes.

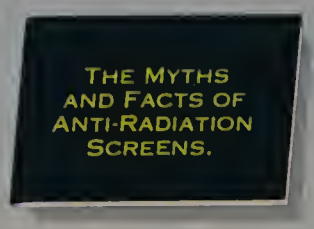
Why buy a screen that only does a fraction of what you need, when one does it all? **NoRad.**

*The **NoRad Shield** is available in several models to fit virtually all IBM® PCs and compatibles, terminals and large format displays.*



*The **NoRad Shield** fits Apple® and Macintosh® displays, and is available in a platinum-colored frame for the SE and the Classic.*

Call now to learn more about the **NoRad Shield** *and receive your free* MYTHS AND FACTS OF ANTI-RADIATION SCREENS *booklet.*



1-800-262-3260

NoRad

NoRad Corporation 1549 11th Street Santa Monica, CA 90401
(213) 395-0800 FAX: (213) 458-6397

Circle 292 on reader service card

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NEW PRODUCTS

Edited by Carolyn Bickford

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

50-1 Classic Upgrade Kit

Consists of 50MB Europa hard drive and the Io-1, a 1MB memory-upgrade board that can be further populated to increase system's RAM to 2.5MB or 4MB. $778. Microtech International, 203/468-6223, 800/626-4276.

ColorMaster Plus Printers

Color thermal-transfer printers: model 6603 prints 8½-by-11-inch pages, and model 6613 prints both letter-size and 11-by-17-inch pages. Available with PostScript output. Model 6603 $6995; model 6613 $9995. Calcomp, 714/821-2000, 800/932-1212.

ColorMaster Plus Printers

ColorPage E16

Multiple-resolution (640 by 480, 832 by 624, 1024 by 768) 16-inch color monitor that may be configured with the LC, IIsi, or IIci Mac built-in video boards. $1595. E-Machines, 503/646-6699, 800/344-7274.

ColorPage E16

Dycam Model 1 Digital Camera

Captures up to 32 photographs in gray-scale and stores them in TIFF format for later transfer through computer's serial port. Measures 3 by 7 by 1 inches and is fully automatic, including focus. $995. Dycam, 818/998-8008.

Hublet

Stand-alone four-port repeater for 10BaseT networks. Connects up to four devices to a single 10BaseT outlet, eliminating the need to run more 10BaseT leads from the main hub. Hublets may also be daisy-chained together. $399. Shiva Corporation, 617/252-6300, 800/458-3550.

LaserMaster 800/4

PostScript-compatible, 4-pages-per-minute laser printer, based on Canon LX engine. Features 800-dpi output and includes RISC-based processor for high-speed output. Supports TrueType fonts. $3695. LaserMaster, 612/944-9696.

LaserMaster 800/4

Lazer Link II

SCSI bus extender that enables users to locate and use Macintosh-compatible peripherals up to 1 kilometer away. Connection between local and remote SCSI bus extenders via fiber-optic cable. Supports maximum SCSI data rate of 3.65MB per second in asynchronous and synchronous modes. Requires no additional software. $1295 per unit. Applied Concepts, 619/453-0090, 800/624-6808.

Lazer Link II

MacVision Video Digitizer

Easy-to-use 24-bit-color video digitizer. Ships with digitizing software and plug-in modules for MacVision Image Processing 4.0, Adobe Photoshop 1.0.7, and Digital Darkroom 2.0. System 7–compatible. $999. Koala Acquisitions, 408/287-6311.

MaxLite/M Fax Modem

Pocket-size (2⅞ inches wide, by 4¾ inches long, by 1 inch high) 9600-bps fax machine and 2400-bps Hayes modem. $499. Macronix, 408/453-8088, 800/468-4629.

MaxLite/M Fax Modem

Maya Modem 9600

High-speed modem complies with standard protocols. Includes modem cable, asynchronous and synchronous operation, volume control, and introductory subscriptions to online services. Also comes with 30-day money-back guarantee, 5-year warranty, and free technical support. $695. Maya Computer Company, 802/496-6982, 800/541-2318.

ProColor Premier

Desktop film recorder for the Mac features a 24-bit color technology for transferring digital images to film. Company claims it produces 4K slide in less than 90 seconds. $7495. Agfa Compugraphic, 508/658-5600, 800/227-2780.

QuickSCSI

SCSI-2 NuBus host adapter for Mac II family. Allows

(continues)

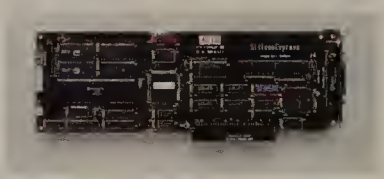
data-transfer rate more than three times as fast as a SCSI port and provides disk mirroring for continual backup. Supports sustained data-transfer rates of 4.4MB per second and burst data-transfer rates of 6MB per second. Does not disable SCSI port. A/UX- and System 7–compatible. $599. PLI, 510/657-2211, 800/288-8754.

Science Laboratory Interface System for the Mac

Hardware and software interface for performing scientific measurement and analysis. Interface records and graphs measurements taken from various sensors: temperature, pH, event timing, electrical quantities, sonic ranging motion studies, force. Comes with power cables, manual, HyperCard software, and laboratory workbook. External sensors and probes available at extra charge. 2MB min. memory. $549. SciMaTech, 415/424-1100, 800/525-5344.

SiliconExpress

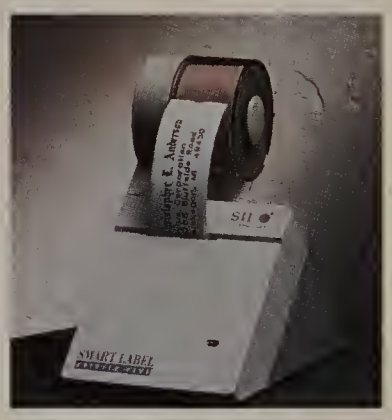
SCSI-2 coprocessor board. Transfers data directly to and from memory, resulting in faster performance on any member of the Mac II family. $995. Atto Technology, 716/688-4259.



SiliconExpress

Smart Label Printer Plus

Lightweight 6.3-by-3.6-by-6.1-inch label printer can mix multiple font sizes and styles on the same label. Prints graphics and database information. Includes SLP Plus DA, cable, and roll of labels. $249.95. Seiko Instruments USA, 408/922-5900, 800/888-0817.



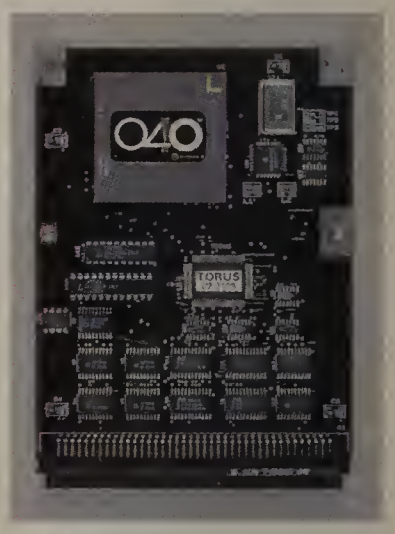
Smart Label Printer Plus

SupraModem 9600

Modem that provides 9600-bps throughput with V.32 industry-standard protocol. Features adjustable-volume speaker. $699.95. Supra Corporation, 503/967-9075, 800/727-8772.

TokaMac SX

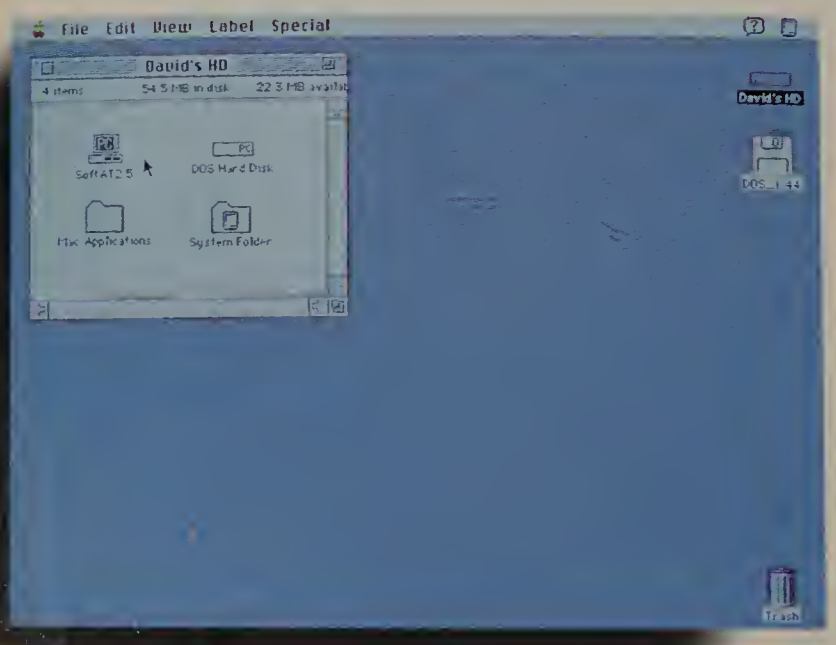
Accelerator board with 68040 processor increases performance of the SE/30 and IIsi beyond speed of the IIfx. $2995. Fusion Data Systems, 512/338-5326.



TokaMac SX

Xceed MacroColor II

24-bit video board for Mac II product line. Provides 24-bit true color, and Monitor-XCEED gamma color-correction software. Virtual Video utility expands computer desktop beyond the screen limits. $569. Micron



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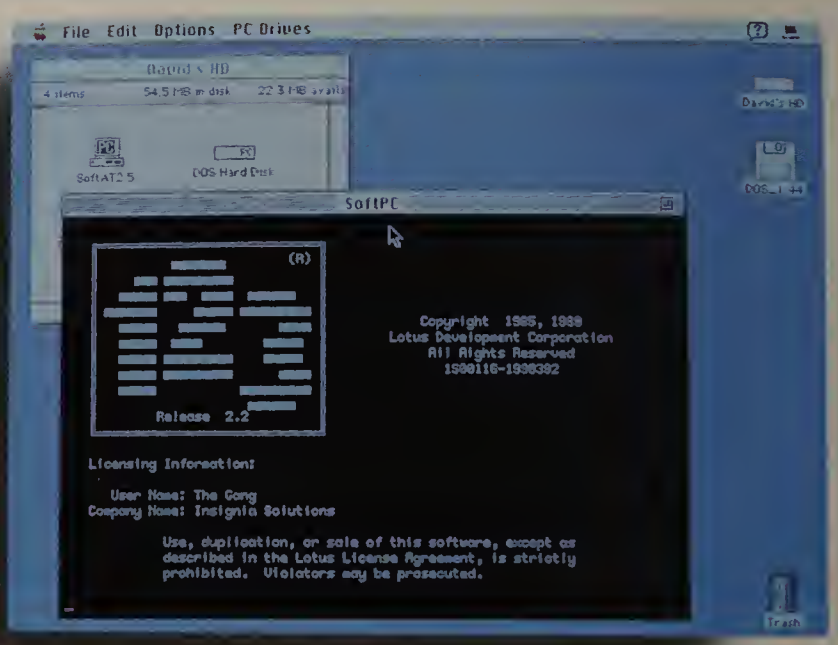


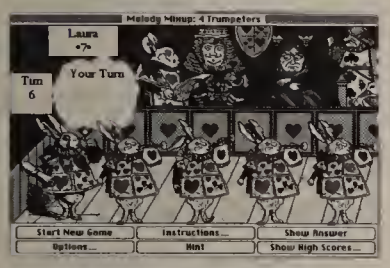
Click,
It's A Mac
And A PC.

Technology, 208/368-3800, 800/642-7661.

SOFTWARE

Adventures in Musicland

Music games collection including Concentration and Melody MixUp, a mystery melody that grows longer as players try to match it



Adventures in Musicland

note by note. System 7–savvy. 1MB min. memory. $79. Dr. T's Music Software, 617/455-1454.

At Your Service

Talking DA reminds user of appointments and special events, delivers E-mail, provides system information, and suggests work breaks. System 7–compatible. 2MB min. memory. $59.95. Bright Star Technology, 206/451-3697, 800/695-1860.

The Blue Parrot

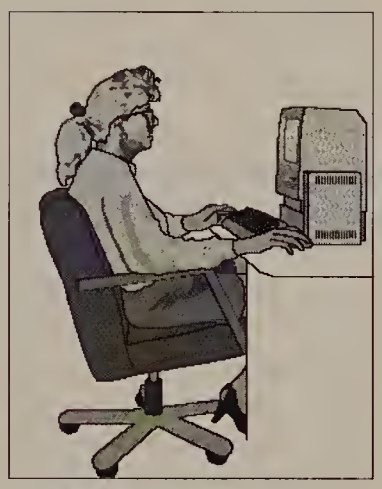
Laser printer–queue software displays printing queue of up to five documents. Displays job queue at each printer on network. System 7–compatible; cdev. $149.95 for five-user network. Casa Blanca Works, 415/461-2227.

Cause

Graphical, nonscripting database-development system. You choose resources, then construct paths in an interactive editor to determine how resources work together. 1MB min. memory. $495. Cyma, 602/831-2607, 800/932-2873.

ClickArt Color Graphics for Presentations

More than 250 high-quality full-color images in PICT2 or EPS designed for use in presentations. Includes representations of time and money, people, computers, communications, logos, maps, flags, business symbols, hand symbols, backgrounds, and arrows. 1MB min. memory. $169.95. T/Maker, 415/962-0195.



ClickArt Color Graphics for Presentations

DeltaGraph Professional

Complete charting, graphics, and presentation software that features more than 40 chart types, from basic column, bar, and pie charts to ternary, surface, and *x-y-z* scatter charts. Users can manipulate charts, define custom-chart libraries and presentation templates, and create color blends. System 7–savvy. 2MB min. memory. $295. DeltaPoint, 408/648-4000, 800/367-4334.

EPlanner 2.0

Midrange project-planning and -tracking application. Offers projected-versus actual scheduling, project calendars, sharable resource pools, individual resource calendars, task and milestone dependencies, resource-load histograms, and user-definable

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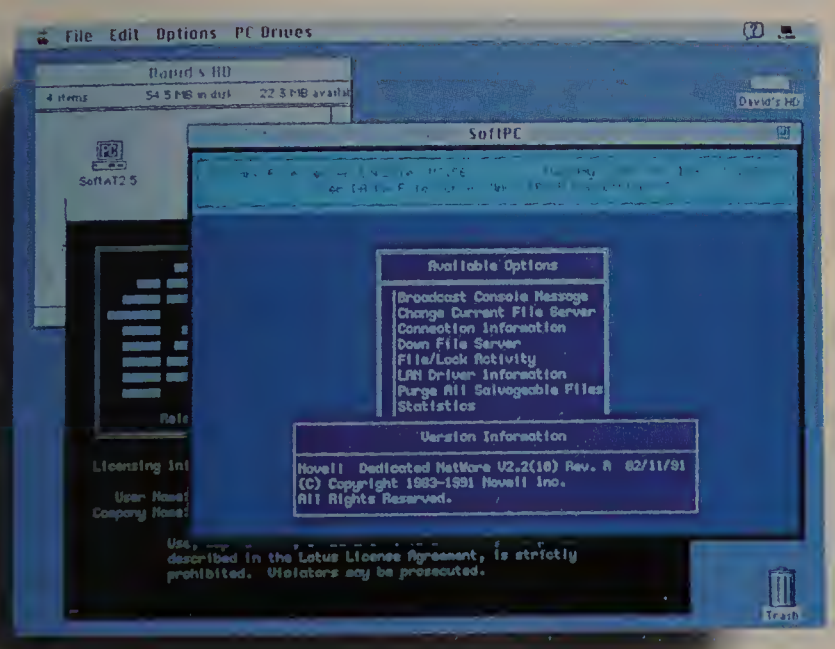

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Circle 72 on reader service card.

chart symbols. System 7–compatible. 512K min. memory. $255. Foundation Solutions, 919/481-3517.

Fair Witness

Organizes and manages in one document different types of information: text, numbers, dates, pictures, and sound. Outlining capabilities, customizable information chart, automatic inclusion of dates, and sort capabilities. Free-form view turns screen into electronic whiteboard. System 7–savvy. 1MB min. memory. $495. Chena Software, 215/770-1210, 800/245-4577.

InterShare

Allows Mac workgroups on AppleTalk network to share modems and Abaton fax modems. Operates as network resource; requires no dedicated server. 1MB min. memory. $179. Abaton, 510/683-2226, 800/444-5321.

ModelShop II

A spatial design, visualization, and presentation package. Advanced modeling, rendering, walk-through, animation, and sun-study capabilities. Includes Quick-PICS animation compression and playback utility. System 7–compatible. 2MB min. memory. $895. Paracomp, 415/956-4091, 800/877-7749.

Mutant Beach

Native Nick must overcome mutants on his island to return the stolen nose of Mohawk, the volcano idol. Game features animation and, for users of System 7, continuous four-channel multitrack sound. 2MB min. memory for color version. $69.95. Inline Design, 203/364-0063.

NetDistributor

Allows a network distributor to easily install from one central machine new software on all Macs connected to an AppleTalk network. Maintains a history of all installations performed. System 7–compatible. 1MB min. memory. $395 for 100 users. Trik, 512/443-2252, 800/766-0356.

NetMinder Ethernet

Transforms a Macintosh into an Ethernet network analyzer. Software uses the Ethernet board to capture, analyze, and decode data as it flows through the network. Includes features for troubleshooting, debugging, and analyzing the network. System 7–compatible. 1.7MB min. memory. Call vendor for list of Ethernet boards supported. $495. Neon Software, 510/283-9771.

OnTrack/Mac Videotape Control Kit for HyperCard

Interactive video-editing program and cable to connect Mac to VCR. Allows camcorder and VCR control via the Mac. Search, log, edit, and play videotaped segments in a HyperCard base. Includes CueTrack, a HyperCard-based tape logger/assembler. Requires HyperCard 2.0 or later. 2MB min. memory. $199. Abbate Video Consultants, 508/520-0199.

PakWorks

Archiving utility combining global file-filtering and proprietary high-speed data compression. Company claims it packs files or folders ranging from 30,000 bytes per second on a Classic to up to 150,000 bytes per second on an SE/30. File-filtering option allows users to pack only selected

file types or exclude certain file types. 1MB min. memory. $79.95. Small Miracles, 203/967-8260.

Plottergeist 2.0

Plots TrueType fonts from popular applications onto pen plotters from Hewlett-Packard, CalComp, Roland, Houston Instrument, Mutoh, and Ioline, and vinyl cutters from Roland, Graphtec, and Ioline. Background plot-ting (with System 7) and page-preview features included. System 7–compatible. 2MB min. memory. $395. Palomar Software, 619/721-7000.

RouterCheck

Tracks and monitors Apple Talk routers. Gathers and reports information from multiple brands of routers from a single Mac anywhere on a network or set of networks. Network managers can track router location and configuration, perform zone verification, and optimize network performance. System 7–compatible. 1MB min. memory. $649. Neon Software, 510/283-9771.

TextureSynth

Textured-image–synthesis program. Creates richly textured and patterned images, in color or gray scale, that can be used as backgrounds, area fills, masks, or surface maps. Saves as PICT or TIFF files at 8- or 24-bit pixel depths. 40 sample textures included. System 7–compatible. 1MB min. memory. $149. Pantechnicon, 408/427-1687.

TwinIt

Allows networked Mac users to back up any hard drive to a second drive automatically and continuously. System 7–compatible; cdev. $249. Golden Triangle, 619/279-2100.

VideoAuthor

Allows developers to design and create a complete interactive video application with visual effects, HyperCard-driven interactivity, and a custom interface on the Mac II family. Requires no scripting or programming knowledge. HyperCard 2– and System 7–compatible. 2MB min. memory. $395. HyperPro, 408/522-1300.

CD ROMS

ICP Apple Macintosh Software Product Database on CD-ROM

Lists 1667 products. Includes demonstrations of products from Microsoft Corporation, Synergy Software, Wolfram Research, and others. Requires HyperCard 2.0. $29.95. Available from authorized Apple dealers or ICP, 317/844-7461, 800/428-6179.

ImageCELs

Offers 1150 high-quality texture maps and images—photo-realistic brick, metals, marble, backgrounds, landscape images, and so on—in numerous file formats, including TIFF and PICT2. $495. Imagetects, 408/252-5487.

ImageCELs

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HOW DOES OUR HIGH DENSITY DRIVE STACK UP AGAINST THEIRS?

Everyone wants a second SuperDrive, but not everyone wants to pay the hefty price. Now there's an alternative. Applied Engineering's new AEHD 3.5" high density drive looks, feels, runs, reads, writes just like Apple's SuperDrive. Even when it's reading and writing MS-DOS disks. But it costs a lot less. And with our exclusive 2-color read/write indicator you can actually tell what your drive is *doing* at any given moment. We even make a Mac II external drive adapter ($19), so you can add a second high density drive to your SuperDrive equipped Mac II, IIx or IIfx. So how's our drive stack up against theirs? That's the bottom line.

Features	Apple	AE
FDHD (read/write MS-DOS, ProDOS)	yes	yes
Sony mechanism	yes	yes
Manual and auto eject	yes	yes
FCC certified design	yes	yes
Apple-standard footprint	yes	yes
ABS plastic case	yes	yes
Apple-standard platinum case	yes	yes
2-color read/write indicator	no	yes
Full daisy-chain compatibility	yes	yes
Custom molded DB-19 cable	yes	yes
800K capacity	yes	yes
1.44 MEG SuperDrive capacity	yes	yes
One year warranty	yes	yes
Worldwide dealer sales & support (over 2,000)	yes	yes
800K price MSRP	$399	$289
SuperDrive MSRP	$399	$339

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ACCESSORIES

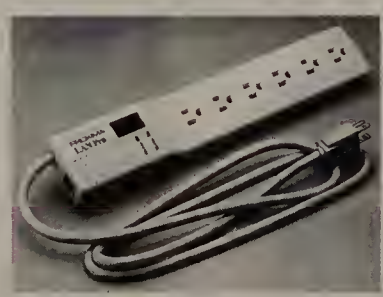
KeyCappers

Pressure-sensitive keyboard labels that represent the keyboard characters accessed with the option or shift-option key combinations. Labels currently available in versions for U.S., British, and International systems. $19.95. PowerByte, 212/472-5874.

KeyCappers

LAN Pro Model S20LP

Surge and electrical-noise suppressor designed specifically for network applications. Includes limited lifetime warranty, polarity/ground fault indicator, resettable circuit breaker, audible alarm when surge protector fails, and six outlets. Protects equipment against surges and spikes of up to 6000 volts. $79.95. Proxima Corporation, 619/457-5500, 800/582-2580, 800/582-0852 in California.



LAN Pro Model S20LP

Maccessories Classic Anti-Glare Filter

Company claims that its product reduces glare reflected from a Macintosh Classic screen by up to 96 percent and improves screen contrast by up to 20 percent. Filter is made of optical-quality glass with ceramic antireflection and scratch-resistant coatings. $69.95. Kensington Microware, 415/572-2700, 800/535-4242.

MacGlare/GuardPlus

Antiglare screens that company claims eliminate up to 99 percent of VDT glare. Made of tempered or laminated safety glass, available in blue or neutral gray. Screens fit Mac Classic, Plus, SE, and SE/30 screens. $89.95 to $249, depending on size. OCLI, 707/545-6440, 800/545-6254.

Wrist Reminder

Portable wrist rest worn to support one palm while limiting downward wrist

Wrist Reminder

flexing. Other wrist-support products include Wrist Trolley, which supports wrists independently during data entry, and Keyboard Platform, which mounts under the keyboard and provides angulation of the keyboard and height-adjustable wrist support. Wrist Reminder $19.95; Wrist Trolley $99.95; Keyboard Platform $49.95. MicroComputer Accessories, 213/301-9400, 800/521-8270.

BOOKS & VIDEOS

Inside Macintosh, Volume VI

Fully documents System 7 and contains updated information on a number of managers described in ear-

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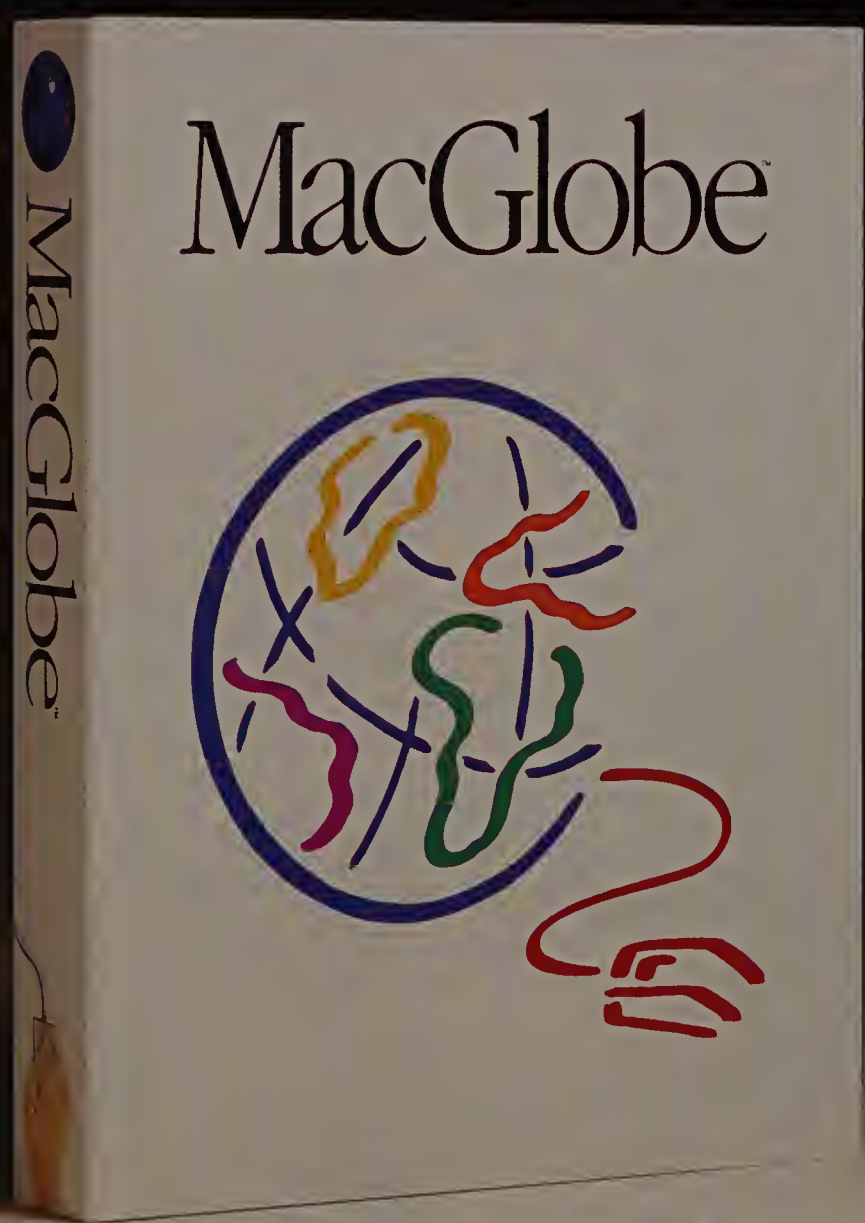

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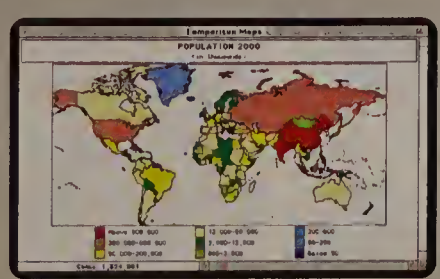

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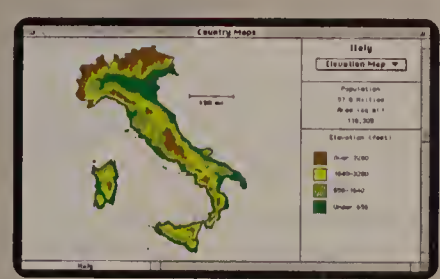

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Training series including training for HyperCard 2.0, Excel 3.0, Word 4.0, PageMaker 4.0, QuarkXPress 3.0, FileMaker Pro, Works 2.0, and Canvas 3.0. "Introducing System 7.0" provides information on installing System 7, memory requirements, how to deal with compatibility problems, networking with 7, eliminating the Font/DA Mover, and using TrueType fonts. Each video is two hours long and comes with a 30-day money-back guarantee. Most tapes $49; "Introducing System 7.0" $69. Macacademy, 904/677-1918, 800/527-1914.

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Includes step-by-step tutorials, examples, and screen illustrations. Details new features of Excel 3 (including Autosum button) and System 7. Written by the Cobb Group. $27.95. Microsoft Press, 206/882-8080, 800/677-7377.

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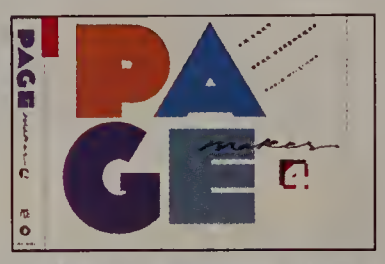
Answers PageMaker questions with three-column format. Column 1 defines program or task; column 2 shows the steps to perform it; column 3 provides additional notes and tips and tricks. Comes with index and set of charts listing keyboard commands and shortcuts; 764 pages. Written by Robin Williams. $29.95. Peachpit Press, 510/548-4393, 800/283-9444.



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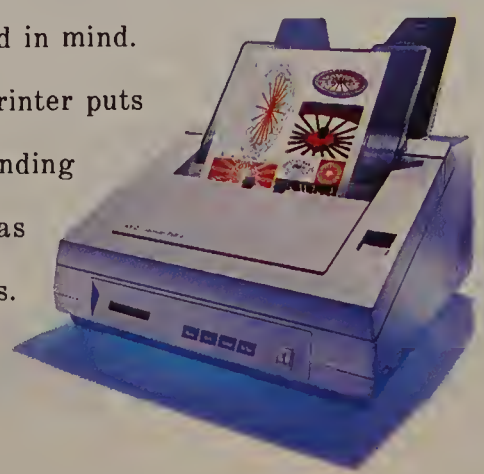

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Quick Tips

The embossed look, System 7 memory limits, useful sound recordings, and more

BY LON POOLE

Ordinarily, pressing the ⌘ and option keys simultaneously shows where all the buttons are on a HyperCard card (as a tip indicated in May). But Ammon Skidmore of Carlisle, Massachusetts, points out that a determined programmer can block this trick. For example, the following short handlers, added to the beginning of a stack script, make the Mac beep instead of outlining buttons when you press the ⌘-option key combination in most circumstances:

```
on idle
   repeat while the optionKey is down ¬
  and the commandKey is down
   beep
   end repeat
end idle

on mouseWithin
   repeat while the optionKey is down ¬
  and the commandKey is down
   beep
   end repeat
end mouseWithin
```

These two handlers recognize when you're pressing ⌘-option, and they repeatedly execute the Beep command for as long as you press those keys while HyperCard is idle or while the pointer is within the bounds of a field or button. These two handlers stop HyperCard from revealing button locations about 95 percent of the time. (These handlers don't intercept keystrokes during the instants when the pointer enters or leaves a field or button, for example.) If you remove the Beep commands, the handlers remain silent while preventing users from peeking.

Memory Limits

Q I just installed System 7 and was shocked to find virtual memory does not work on my Mac IIcx, which has 20MB of RAM. Will Apple correct this, or do I have to choose between throwing out $1000 in SIMMs and returning to System 6.0.7 and Connectix's Maxima?

Fred Cherney
Scarborough, Ontario, Canada

A You need Mode 32, utility software from Connectix Corporation (415/324-0727) that lets you turn on 32-bit addressing using System 7's standard Memory control panel on a Mac SE/30, II, IIx, or IIcx (see "Memory Control Panel"). Those models cannot otherwise use 32-bit addressing because their ROMs (permanent, read-only memory) are incompatible with it. (Mac LC, IIsi, IIci, and IIfx models don't need Mode 32 because they have what Apple calls 32-bit-clean ROMs. Mac Classic, SE, Plus, and Portable models can't use 32-bit addressing because their 68000 central processing units don't support it.)

Without 32-bit addressing, you can use only 8MB of RAM regardless of the amount installed. In addition, total memory size (virtual memory plus RAM) cannot exceed 14MB. On Macs with NuBus boards installed, that limit is 1MB lower for each installed board. Furthermore, virtual memory is fragmented unless you install all NuBus boards consecutively, starting at one end slot or the other. (On a IIcx, you must fill slots from left to right.)

With 32-bit addressing, the limit on total memory size is 1 gigabyte (1024MB). NuBus boards don't affect the limit, but if you turn on virtual memory you must have a hard drive (it can't be a removable hard drive) with a block of available space as large as the total memory size (again, virtual memory plus RAM). (System 7's virtual memory doesn't work on the Mac Plus, SE, Classic, or Portable models because their ROMs lack some necessary information.)

Normal Distraction

Q I recently bought a 13-inch Apple color monitor. When it is on, a thin, faint horizontal line can be seen about three inches above the bottom of the screen. The retailer says this line is normal and can be seen on all of these monitors. What causes it, and why should it be considered normal?

James D. Wuest
Montreal, Quebec, Canada

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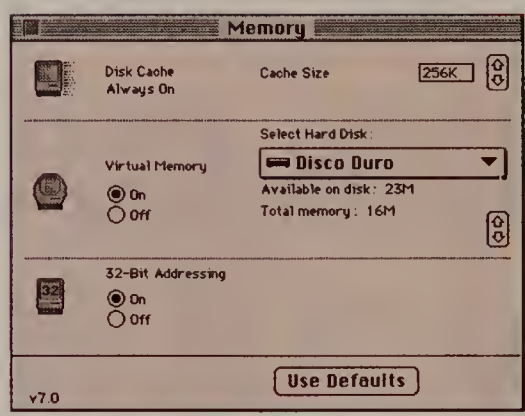

MEMORY CONTROL PANEL Turning on the 32-Bit Addressing option of System 7's Memory control panel lets a Mac access more than 8MB of RAM or 14MB of virtual memory. That option and the Virtual Memory controls, which let System 7 transparently use part of a hard drive as additional memory, don't appear on all Macintosh models.

A You are looking at a thin wire that is part of your monitor's Sony Trinitron picture tube. I can see the same wire on my Apple color monitor and on my 13-inch Sony color TV. The wire is far more noticeable on the computer monitor because you sit closer to it and it displays a relatively stationary image.

The horizontal wire stabilizes a grid of thin vertical wires inside the tube. The grid masks the color phosphors that coat the back of the tube so that an electron beam scanning horizontal lines across the inside of the tube illuminates linear dot patterns across the screen. Those dot patterns make up the picture you see.

Sound Idea

TIP: I'm tired of hearing IBM users refer to the Mac as a toy. The microphone that comes with the LC and IIsi really opened the floodgates for ridicule and teasing. "What are you going to do with that, make funny noises to yourself all day long?" These people start to see the power of audio in computing when I demonstrate how easy it is to attach voice messages to documents I give to colleagues. Sure, I could add a Read Me note, but people have a tendency to skip those. My voice gets my point across with less work for me and less work for them.

You can record a 10-second message using System 7's Sound control panel. Then you open the System file (inside the System Folder) and look

(continues)

BOLD RELIEF

You can create text that looks embossed by using three shades of the same color—a highlight, a shadow, and a midrange. Determine what you want those three shades to be and create them in your program's color palette. This example was created with a paint program, but it could just as easily have been done in a draw program by combining three separate text blocks.

Create a background and assign it the midrange color.

Create the text to be embossed (in this case, the word *emboss*) and assign it the shadow, or darker, color. The thicker the typeface, the more flexibility you have in determining offset values.

Duplicate the text, offset the duplicate above and to the left of the shadow version (in this case, 4 pixels in each direction), and assign it the highlight, or lighter, color. For a more pronounced embossed effect, increase the offset distance a bit.

Duplicate the text again, assign it the midrange color, and position that duplicate halfway between the darker and lighter versions (in this case, 2 pixels above and to the left of the darker one) to achieve the embossed effect.

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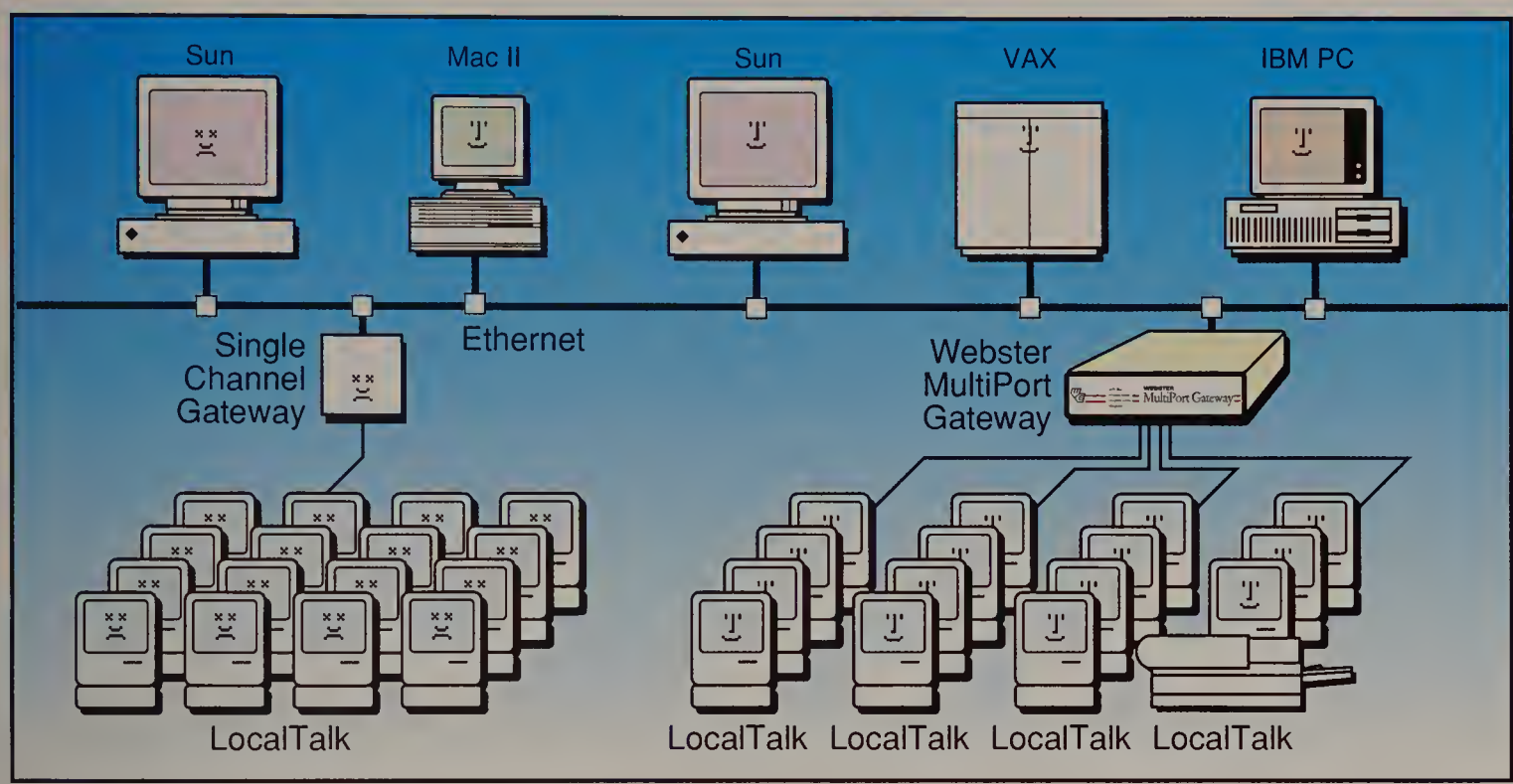

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TRUETYPE CHICAGO SYMBOLS This keyboard map shows 21 special symbols present in the TrueType version of the Chicago font. To type one, set the font and size to Chicago 13 (or any other size for which no fixed-size Chicago is installed) and press one of the keys shown here while also pressing the control key.

for your message. Drag it from the System file to the disk you'll give your colleague. Just by double-clicking an icon, that person can listen to your message on any Mac that's running System 7.

Grant Hansen
Iowa City, Iowa

System 7 may take 30 seconds or more to open a System file that contains lots of fonts, sounds, and other items. To keep the size of the System file down, drag your voice messages out of your System file to the desktop, a folder on your start-up disk, or the Trash. On Mac models other than the LC and IIsi, you can record sounds using a $149 MacRecorder Voice Digitizer from Farallon Computing (415/596-9000) or a $119 Voice Impact from Articulate Systems (800/443-7077). These products let you record longer sounds and compress them to take less disk space than the standard sound-input capabilities of an LC or a IIsi allow. In addition, Voice Impact includes sound-editing software for combining sounds, deleting mistakes, and so on. You can buy separate sound-editing software for use on any Mac with sound-input capability. Articulate's $79 Voice Record lets you record, edit, and play back; it automatically replaces Apple's standard sound-record/playback-controller software. Farallon's $195 SoundEdit lets you record, edit, play, mix, and add special effects. Both companies also sell more expensive and powerful sound-input products.—L.P.

More Chicago Symbols

TIP: In addition to the four special symbols that have always been part of the Chicago font (⌘, ✓, ◆, and), the TrueType version of Chicago shipping with System 7 has many new special symbols. They include ⌥ and ⇧, which Apple uses to represent the option and shift keys. "TrueType Chicago Symbols" shows how you can type them. However, you probably won't see any of the new special symbols if you set the font size to 12-point or any other size for which a fixed-size (bitmapped) Chicago is installed in the System file. (Chicago 12 is in the ROM of all Mac models except those older than a Mac Plus.) Fixed-size versions of Chicago don't include the new symbols, and most programs use fixed-size fonts wherever possible [MacDraw Pro is one exception—L.P.]. Also, PageMaker 4.01 doesn't print the new symbols [unless you press option while choosing Print from the File menu to use the standard Apple printer drivers—L.P.].

Alex Narvey
Winnipeg, Manitoba, Canada

If you have trouble typing the special symbols in a particular program, try typing them in the Key Caps desk accessory. Because Key Caps always displays 12-point text, you'll see a box instead of the special symbol. Copy it anyway, paste it where you want the special symbol, and change its font there to 13-point Chicago. One other symbol, ⌫, can't be typed but can be generated by typing the following command in HyperCard's message box and pressing return: **put numToChar(8)**. HyperCard replaces the command with a box; copy it, paste it where you want the ⌫, and change its font there to Chicago 13.—L.P.

Stubborn Old DAs

TIP: A friend of mine recently removed System 7 from his Mac because he couldn't get Microlytic's Word Finder or Deneba's Spelling Coach Professional, both desk accessories, to work after dragging them to the Apple Menu Items folder. However, they work with System 7 if you install them using Apple's Font/DA Mover version 4.1 or later (your Apple dealer may give you a copy, or try an online service or user group). Alternatively, you can use Suitcase II version 1.2.9 or later, from Fifth Generation Systems (504/291-7221), but you must make sure the DA is a separate file—not inside a suitcase file. Also, drag Coach's dictionary files and the Coach Helper file into the System Folder window (don't drag them to the System Folder icon or the Finder will put them into

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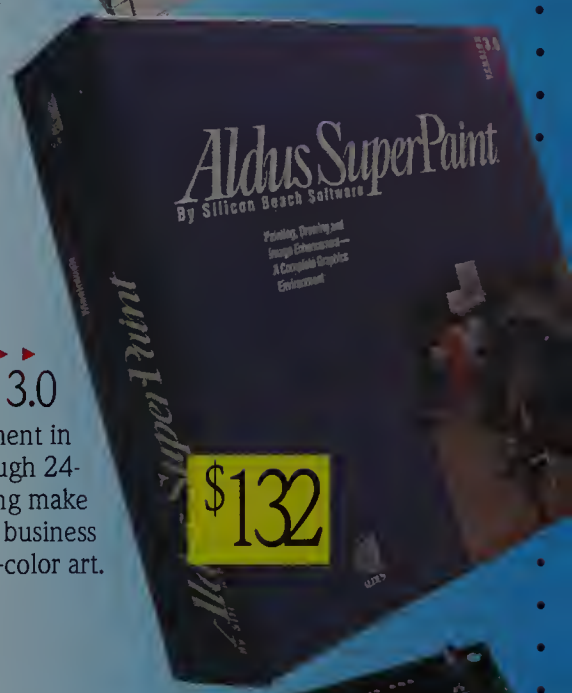

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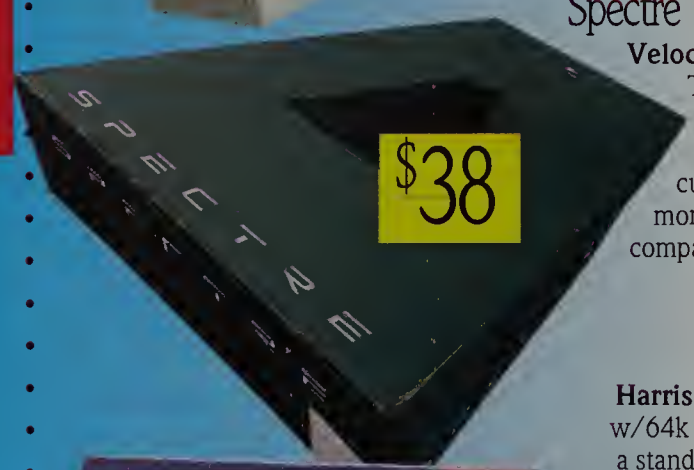

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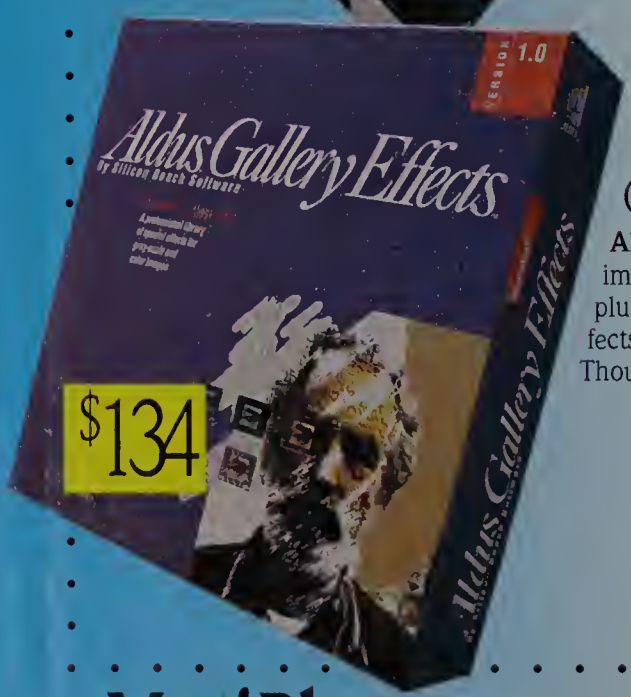

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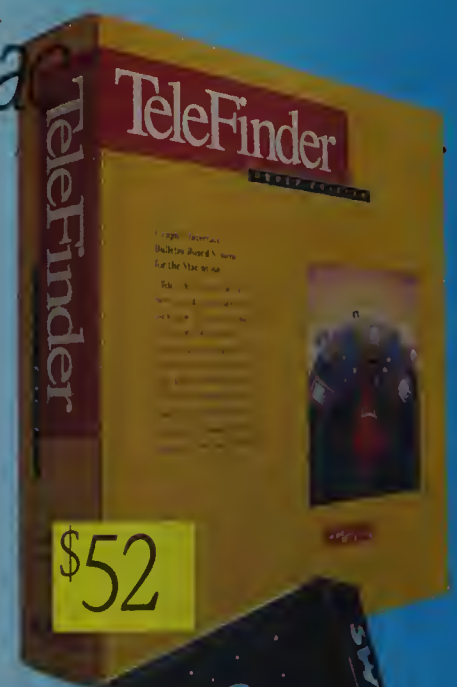
*Macintosh Compatible means we run our company completely on Macs. Everyone has at least one MacIIcx on their desk, equipped with 8 megs RAM, 40MEG Hard Drive, 14" color monitor, connected via our Ethernet network to our custom-programmed database. The database literally runs all phases of our operation — product information, order taking, order processing, inventory control, accounting, purchasing, customer service, technical support. All of us also have complete desktop communications, connecting to online services and other corporate sites around the world via email, networked modems and FAX modems. So you see, we don't just sell 600MEG hard drives, high speed networked modems, and system 7 applications-they're all an integal part of our day to day operation.

All orders shipped overnight for $3." –Mac

WriteNow 2.2 *Special Offer*

T/Maker Buy WriteNow 2.2, the best value in word processing, and get the top grammar checker, Grammatik Mac 2.0 *and* MacTools Deluxe 1.2 FREE! WriteNow 2.2, two-time MacUser Eddy Award winner, offers power, speed and ease of use.

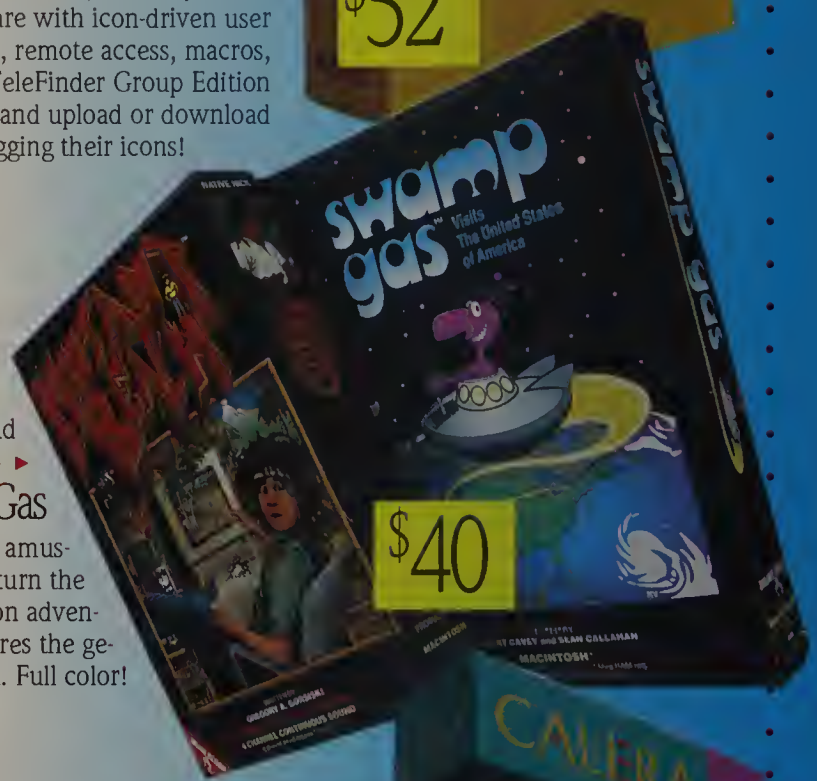


TeleFinder

Spider Island Software ❼ *TeleFinder Professional $52–Group Edition (20 User) $252* System 7 savvy communications software with icon-driven user interface, terminal emulation, remote access, macros, and auto-dial Connect to any TeleFinder Group Edition BBS (4 Mice, MacUser 7/90) and upload or download files simply by dragging their icons!

QuickTools

Advanced Software ❼ This one does it all! Application/document launcher, over 30 screen savers, screen capture, screen locking with password protection, automatic file saving, command key equivalents for all dialog boxes, and mouse menus.



Mutant Beach & Swamp Gas

InLine Design ❼ Native Nick must overcome amusingly mutated creatures and other obstacles to return the stolen nose to his island's idol in this full-color action adventure. Swamp Gas $31. Become an alien who explores the geography of the USA. Full color!

DiskFit *w/Sentinel $78*

SuperMac Software ❼ Only DiskFit makes file location and recovery so fast and foolproof because it backs up in a Finder-readable format. Better at reclaiming space than any other program.Now get Sentinel ™, the award winning file security/data encryption pacakage, for only $20 more when you purchase Diskfit!

WordScan and WordScan Plus

Calera Scan any printed document right into your word processor, spreadsheet, or database with the most powerful OCR available. WordScan offers incredible accuracy and speed at an affordable price. Plus adds advanced productivity features you can't find anywhere else.

LightningScan Pro 256

Thunderware ❼ Unmatched for speed, control and image accuracy.this new scanner allows for 256 levels of true gray at up to 400 dpi. Includes the highly rated ThunderWorks, an image editing application, plus the exclusive SnapGuide system that makes straight scanning easy!

Enhance 2.0

MicroFrontier ❼ Image processing software that combines sophisticated paint, filter, and retouching tools for manipulating grayscale images. Supports virtual images, multiple undos, masking, and filters to contrast, sharpen, and enhance images.

"We're seven savvy." –Mac

"Fax us your PO*–My Fax–206-881-3090."–*Mac*

Publish It! *Easy* v 2.1 w/ FILE-IT!

Timeworks 7 O 1990 MacUser Eddy Award winner. Integrates all the basic tools for DTP into an affordable, easy-to-use program. Incls:112,000-word spell checker, 240,000-word thesaurus, drawing and painting tools, comprehensive page layout tools, and 72 sample templates, and much, more. Now with FILE-IT!, a database and mail merge program.

Band In A Box

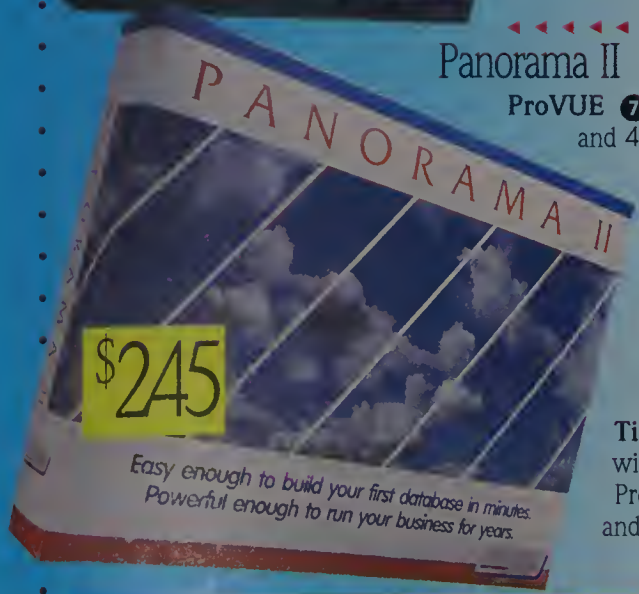
PG Music Automatically create complete professional quality arrangement of bass, drums and piano chording in a wide variety of popular styles of music. Just type in the chord names for any song using standard chord symbols and Band In A Box does the rest!

QuicKeys² 2.1

CE Software 7 O The System 7 savvy version of the leading macro product for the Macintosh. In addition to being fully 32-bit clean and offering Balloon Help, QuicKeys 2 can "drive" applications that support Apple® Events through its Apple Events Extensions.

Type On Call

Adobe 7 Now you can access the entire Adobe Type Library–over 1000 fonts (#'s 1-210) delivered on a single CD ROM. Select the fonts you want, then give us a call for the code to unlock them.



Panorama II

ProVUE 7 O New version of the 1989 MacUser Eddy and 4-1/2 mice winner that lets you manage business information faster and easier. Easy enough to build your first database in minutes, but powerful enough to run your business for years. System 7 compatible.

Timeslips Accounting Link for the Mac (TAL) *$52*

Timeslips Corp Extend the power of Timeslips III with or without general ledger accounting software. Provides customized income repots and links billing and payment data from Timeslips III to many general ledger or accounting programs.

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SuperDisk! 2.0

Alysis Software 7 O Employs ultra-high-speed compression to expand your hard disk, double network throughput, and create auto-expanding folders. Latest version features MS-DOS compatibility, hot-keys, menus, user programmable extensions, and more. System 7 compatible.

Pixel Paint Pro

SuperMac Software 7 O *New version (2.0)* extends the paint category into artistic image processing. Dramatically simplifies demand design work such as image compositing, masking, and special effects such as embossing, patterning, tinting, and image warping. Too many great features to list. *Pixel Paint 2.1 $165.* The first color paint product for the Mac and still the standard by which all others are judged.

Painter

Fractel Design 7 Real natural media effects, brushes, pens, chalks and even paper grains (22 included). Perfect for fine artists, graphic artists and students. Supports PICT, TIFF, ColorStudio, PhotoShop formats and the Wacom tablet.

SiMMS

Mac's Place 7 O Expand the mind of your Mac! One Meg SIMM, 80 nanoseconds, only $45! Four Meg SIMM only $159. Includes the most complete installation manual available. Get your Mac ready for System 7. See Listings for IIfx prices.

10T Hub & MacCon+ Ethernet

Asanté 7 O *See Listings for Prices* The media flexibility you need in any office with tremendous price performance. Twelve 10BaseT ports, plus one each for thick and thin Ethernet™. Asanté offers a full line of Ethernet cards for all Macs. 5 year warrantee.

DataPlace Hard Drives

Mac's Place 7 O Available only at Mac's Place, these quality Quantum hard drives and Syquest Removable Cartridge drives come with DataWare formating software and each features a selectable SCSI ID switch, two 50 pin SCSI connectors, an external fuse and two AC Plug-ins. See listings for prices.

VersionTerritory

Softwriters 7 *10 User $138.00 7•Updater™ 6 user $68* Allows Network Managers to upgrade or install any software—including System 7—across the network from one Mac. Quickly update your users with DAs, address book lists, and more without interfering with their activities. Get 7•Updater™ if you only need to update to System 7.

4th Dimension & FrameMaker

ACIUS/Frame Tech You can now combine the power of 4th DIMENSION with the flexible capabilities of FrameMaker to easily produce your catalogs and directories. Using technology available from ACIUS, database publishing becomes accessible to the average user, not just programmer.

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"We're Mac compatible. Are *they?*" –*Mac*

Personal Press 1.1

Aldus 7 O The page layout program for people who thought page layout was for someone else. Provides exceptional ease-of-use and affordability—create publications from scratch or use AutoCreate to automatically assemble your stories and graphics into pre-built templates. Includes full-featured word processor, full color and grayscale graphic importing and display, and image controls for scanned grayscale images.

$195

Learning C on the Macintosh

Addsion-Wesley Written by Dave Marks, author of the best-selling Macintosh Programmer Primer series, this self-teaching book/disk package (special vers. of Syamntec's Think C is included) is a comprehensive tutorial in programming fundamentals and C language basics.

$28

Alge-Blaster Plus

Davidson and Associates 7 O Alge-Blaster Plus$28. Ages 12-adult, teaches 1st and 2nd semester algebra. Math Blaster Plus $34. ages 6-12, teaches basic math and problem-solving skills. Math Blaster Mystery, $28. ages 10-adult, teaches problem solving and pre-algebra. Each program incorporates challenging activities, animation and sound that make learning fun.

$28

Think C 5.0/Think Ref

Symantec 7 O Extremely fast 100% ANSI compiler, an even faster linker, an optional global optimizer, a powerful source-level debugger and more Take full advantage of object-oriented programming and new System 7 capabilities.Think Reference $59.Provides instant access to the critical system information you need to program the Macintosh.

$209

DTPro CD ROM

FM Waves 7 Well over 500 professional EPS images for the discriminating designer. Borders, Icons, Arrows and Design elements for newsletters, magazines, office memos, faxes and all of your creative projects. Graphic Orginals - Clip Art with an Attitude -For Distinctive documents, facinating forms and notable newletters pick from one of 15 collections between $28 and $58 each set.

$88

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$64

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Portfolio Systems 7 The personal printing utility that lets you print *any* Mac file on personal-organizer pages—even supports double-sided printing. Dynodex 2.0 $72. Designed the way people actually use address books, this unique desk accessory/application helps you find information in a flash.

$72*ea*

Mac Trak Pro *$224.*
Mac Pro Plus *$139.*

KeyTronic 7 Save valuable time and desk space with an integrated four-button trackball. Includes seven programmable Speed Keys, Click-lock LED, and Speed Key software for complete trackball customization.Ask about a $25. rebate on the trade-in of your Mac-compatible keyboard!

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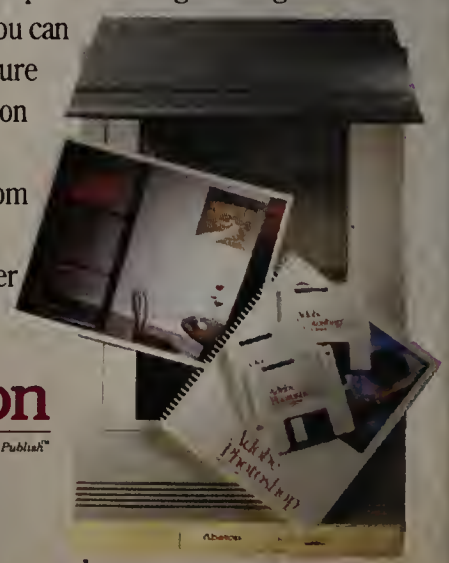

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the Extensions folder). Restart the Macintosh.

Now open the word processor or other program with which you want to use Word Finder or Coach, and press the option key while choosing the DA from the Apple menu. Instead of creating a new program layer for the DA and listing it in the Application menu, System 7 opens the DA in the active application program as System 6 would. Because the DA is using part of the active program's memory, you may need to increase the program's memory size with the Finder's Get Info command.

The only problem with this technique is that System 7 does not close the DA when you quit the application program. With Word Finder, you simply choose Close from the WF menu. Coach, on the other hand, grays its Quit command but may crash the system if you try to use it anyway. I recommend restarting the Mac after quitting the program in which you opened Coach.

Vincent Bumgarner
Norman, Oklahoma

Be sure you back up your System file before installing any old DAs with Font/DA Mover 4.1. More than once, I've been glad I did.—L.P.

PageMaker on a Small Screen

TIP: Going from a large-screen Mac II at work to my 9-inch Classic screen at home involves quite an adjustment. Here's how to get maximum use of a small screen for viewing PageMaker layouts:

1. Close the Style and Color palette windows. You can retrieve them by pressing ⌘-Y and ⌘-K.

2. Hide the scroll bars by unchecking the Scroll Bars item in the Windows menu. Without scroll bars, press option while dragging to scroll with the hand tool, and press ⌘-G to go from page to page.

3. Select the text tool and tuck the Toolbox window in a corner for easy retrieval. Switch between the text tool and the pointer tool by pressing ⌘-spacebar (which actually switches between the pointer tool and the last selected tool). Or you can press ⌘-6 to close and open the Toolbox window.

Wayne Hastings
Memphis, Tennessee

Free Beep

TIP: Along with the six alert sounds installed with System 7, a seventh new sound is stored in the Scrapbook. To use it you just open the Scrapbook, scroll to the sound, copy it, open the Sound control panel, and paste.

Sterling Ledet
via CompuServe

The System 7 Scrapbook file also includes a color version of the Map control panel's world map. To install the color map, you copy it from the Scrapbook, open the Map control panel, and paste. Similarly, you can paste a picture into the Map section of the Control Panel of any version of System 6.—L.P.

Aligning Scanned Documents

TIP: When using a flatbed scanner, aligning a document properly can be difficult. When you lift the lid of the scanner to shift the paper, the paper usually sticks to the lid, falls off, and drifts. After multiple tries, you might get the alignment right. I've found a handy solution.

Simply place a cork-backed metal ruler on top of the document, with some of the ruler sticking out from under the lid to act as a handle. After a preview—which most scanning programs offer—you merely shift the handle a bit to shift the document, because the ruler's cork layer clings to the document.

Tim Murray
Boca Raton, Florida

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Lon Poole answers readers' questions and selects their tips for this column. His two most recent books are Amazing Mac Facts *(Microsoft Press, 1991), a collection of the best published tips; and* Macworld Guide to System 7, *IDG Books Worldwide, 1991).*

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Getting Started with Image Processing

An introduction to the tools and techniques of electronic imaging

BY JIM HEID

Photography is going electronic, and the Mac is helping to take it there. Conventional film and processing techniques haven't yet gone the way of the daguerreotype, but more and more publishers, photographers, designers, and scientists are relying on electronic image manipulation, or *image processing,* to help them publish, retouch, and analyze images.

This month, I introduce the basic concepts behind image processing and the hardware and software it requires. Next month, I'll examine some advanced image processing and printing concepts, and I'll spotlight some brand-new developments in the field.

Image Processing Applications

Before delving into the technicalities behind image processing, let's take a closer look at who can benefit from the technology.

- Publishers and photographers can use image processing software to crop, retouch, and otherwise alter photographs. For example, they can erase scratches and blemishes, remove distracting backgrounds, and improve the contrast and brightness in photos.
- Publishers and printing companies working with full-color images need to perform two important steps to get them into print. *Color correction* involves tweaking the hues in an image for greater realism. *Color separation* is the process of dividing a color image into four separate images, one each for cyan, magenta, yellow, and black (CMYK)—the four *process colors* that printing presses combine to print color images. Until recently, the Macintosh wasn't involved in this upper stratum of imaging; now it's a major player.
- Illustrators, designers, and artists use image processing software to create special effects that would otherwise require hours of darkroom work or that could not be done any other way. Some image processing programs can even make an image look like it was painted in a pointillist style.
- Scientists and educators use image processing software to enhance and emphasize important details in an image—the walls of a cell, for example, or a tumor in an X ray. In factories, specialized image processing hardware and software guide industrial robots and check that circuit board parts are installed correctly. And the planetary portraits phoned home by the Voyager space probes wouldn't be nearly as impressive were it not for NASA image processing specialists.

ERIC ADIGARD/MAD

(continues)

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Turning Pictures into Pixels

Before you can bring an image processing program's powers to bear, you need an image. While some people use image processing programs to create original artwork, most work with images created in other types of graphics programs or generated by a variety of hardware add-ons. The most popular are *scanners,* which translate photographic prints or slides into a series of gray or colored dots.

For scanning black-and-white photographs, you need a *gray-scale* scanner such as Apple's Apple Scanner, Hewlett-Packard's HP ScanJet Plus, or Abaton's Scan 300/GS. The latter two, like most of today's gray-scale scanners, are *8-bit* scanners, able to discern roughly 256 levels of gray. The Apple Scanner is one of a dying breed of *4-bit* scanners that can detect only 16 levels of gray, and thus deliver inferior results with *continuous-tone* images such as photographs. As for sharpness, most gray-scale scanners produce images with a resolution of up to 300 dots per inch—more than adequate for creating and printing gray-scale scans (for more details, see "Scanners in View," *Macworld,* October 1991).

To scan color photographs, you need a color scanner such as the HP ScanJet IIc, Sharp Electronics Corporation's JX-300, or La Cie's Silverscanner. These are *24-bit* scanners that can discern millions of colors. In experienced hands, these machines deliver quality that approaches that of five- and six-figure color scanners from firms such as Dainippon Screen and Scitex. Most color scanners also offer 300-dpi resolution, although units providing 600 dpi and higher are available from Sharp, Truvel, Howtek, and others (see "Affordable Color Scanning," June 1991).

For working with color slides, there are *slide scanners* such as Nikon's LS-3500 Film Scanner or Microtek's recently introduced ScanMaker 1850s, which, at $3195, costs about half as much as competing units. Slide scanners generate considerably sharper images—up to 4388 dpi for Nikon's LS-3500 Film Scanner and 1850 dpi for Microtek's ScanMaker 1850s.

If your subject is at hand or on videotape, you can bypass the time and expense of photography by using a video camera or an electronic photography system. Most camcorders and videocassette recorders have *video out* jacks that can connect to *digitizing* hardware, which translates the video signal into gray or colored dots. At the low end of the digitizer spectrum are Koala Acquisitions' $799 MacVision Color Video Digitizer and Digital Vision's $399.95 ComputerEyes/Pro Color Video Digitizer. Both require anywhere from 4 to 30 seconds to digitize an image, so they're unsuitable for fast-moving subjects. On the plus side, they work with Mac Classics and Pluses.

For faster video digitizing, owners of Mac II–family machines can use a *frame-grabber* board such as Mass Microsystems' QuickImage 24, Computer Friends' ColorSnap 32+, or Data Translation's QuickCapture. These are installed in an expansion slot and have connectors for a camcorder or VCR. Accompanying software captures an image in as little as 1/60 second. Most frame grabbers are designed for publishing and multimedia. QuickCapture is oriented toward the scientific and manufacturing worlds. Unlike most frame grabbers, it connects to up to four video sources at once and can capture images when an external event occurs, such as when a strobe light flashes.

Some photojournalists use *still-video* cameras that save images not on film, but on tiny floppy disks. Although electronic photos currently lack the quality of conventional ones, they're quickly improving—and they require no processing. They're ideal for newspapers and low-budget catalogs, service manuals, and newsletters. The least expensive still-video camera is Canon's consumer-oriented $799 Xapshot. A big step up in image quality and price is Canon's $2100 RC-470 Still Video Camera and $2450 Video Floppy Disk Drive, which enable you to store photos on tiny 2-inch disks and transfer them to the Mac via a SCSI cable. Similar products have been introduced by several other photographic-equipment and electronics manufacturers, including Kodak, Nikon, Toshiba, and Sony.

Dycam's $995 Model 1 Digital Still Camera shoots and stores up to 32 gray-scale images that you can transfer to the Mac over phone lines or via a cable attached to the Mac's modem port. It's designed for applications that don't require color or the image quality of a still-video system—documenting insurance claims, photographing real estate listings, or creating photo ID badges.

Image Processing Software

The software that comes with a scanner or frame grabber is sometimes called *image-acquisition* software. It works with the hardware to let you save images on disk. Most image-ac-

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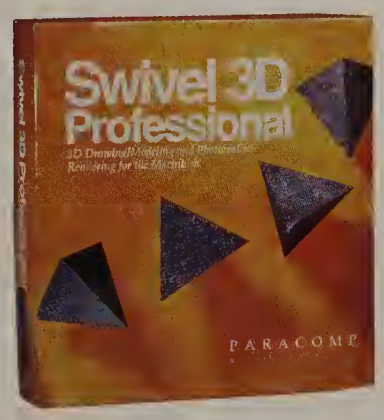

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quisition programs have rudimentary editing features—for cropping out unwanted borders, for example.

But for serious electronic retouching, you need an image processing program. These are similar to paint programs such as Claris's MacPaint and Aldus's SuperPaint. All work with *bitmapped* graphics—images whose individual dots, or *pixels,* correspond to a series of 1's and 0's, or bits. And like paint programs, image processing programs let you alter an image's underlying 1's and 0's, and thus alter the image itself.

Image processing and paint programs have much in common. Both provide on-screen tool palettes containing electronic erasers, pencils, and paintbrushes, as well as tools for typing text and drawing lines, circles, and squares. You can zoom in on individual pixels for detailed work, or zoom out to fit an entire image on the screen. And you have two basic ways to select part of an image to move or modify it: a *marquee* tool for selecting rectangular areas, and a *lasso* tool for selecting irregularly shaped areas.

Some image processing programs work only with gray-scale images while others also support color. Gray-scale programs include Letraset's ImageStudio; Aldus Digital Darkroom; Image, a free program available through user groups and online services; and my favorite, MicroFrontier's Enhance. In the color field, the two hot contenders are Adobe Photoshop and Letraset's ColorStudio.

A Bigger, Better Toolbox

Image processing programs differ from most of their paint partners in that they provide more tools for drawing and modifying. Most image processing programs provide an electronic *airbrush* whose flow rate and nozzle size you can adjust for painting anything from fine details to digital graffiti. A *smudge* tool lets you smear part of an image as though it were a charcoal drawing and the mouse cursor were your fingertip. A *blur* tool softens part of an image; a *sharpen* tool does the opposite. A *rubber-stamp* tool copies one part of an image as you drag the mouse: First you click on the starting point of the area you want to clone. Then, as you move the pointer over the area you want to change, the program duplicates the mouse's movements, copying from the area you first specified to the area where you're drawing.

The tools in an image processing program are also laden with options for tailoring how they work. How fat should the pencil point be? Should paint flow continuously from the paintbrush tool or fade as you paint? Or should it fade, then strengthen, then fade again, as though you're repeatedly applying short brush strokes? Should the paint or pencil lead be opaque, obscuring whatever it touches, or be transparent like watercolor? Photoshop, Fractal Design

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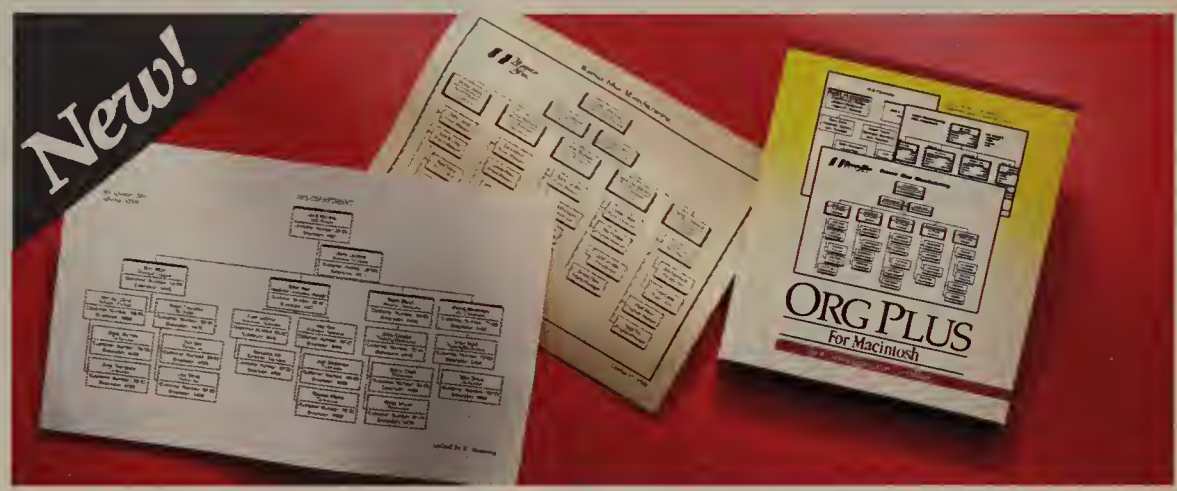

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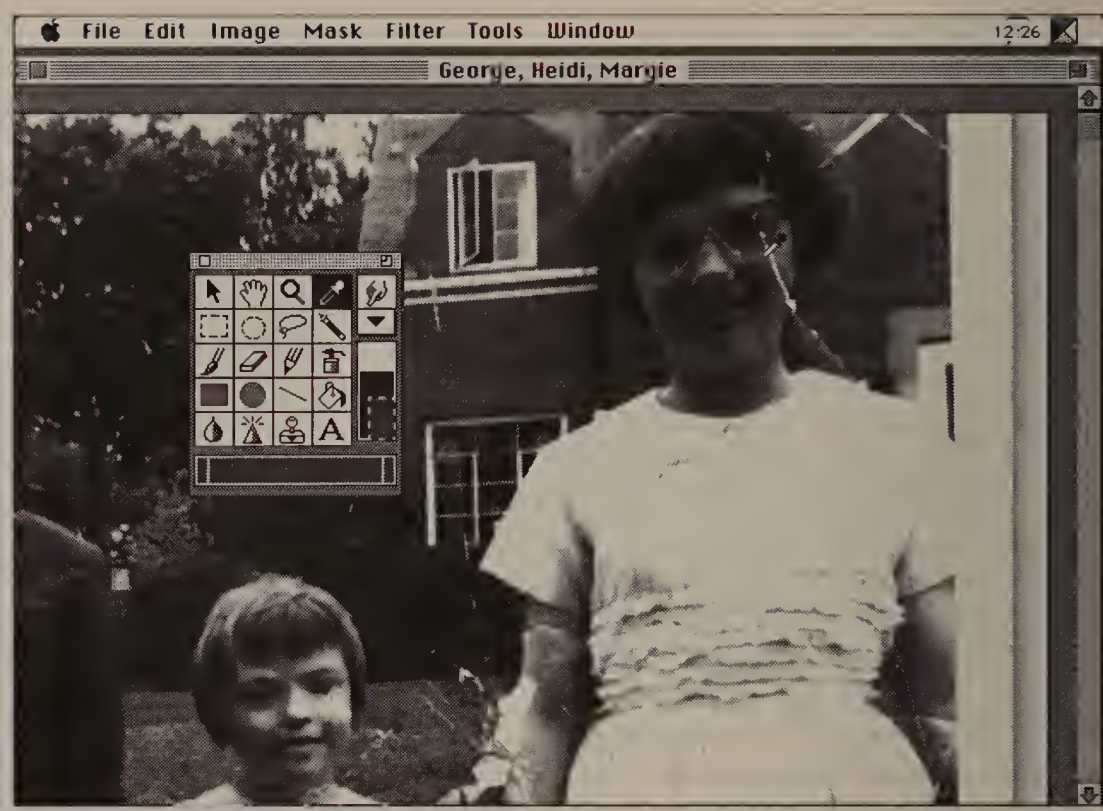

PICK ME UP Above, Enhance's eyedropper tool picks up a gray shade from one area of the photo for retouching a scratch on another. At far right, the final retouched image. The blur, rubber-stamp, and smudge tools are also useful for retouching.

Painter, Time Arts' Oasis, Deneba Software's UltraPaint, and Aldus Digital Darkroom also support pressure-sensitive tablets such as those made by Wacom (see "Getting Started with Input Devices," November 1990).

Image processing programs also provide palettes that let you choose from a variety of gray shades and, in some programs, colors. If you're retouching a scratch out of a photo, you might use the palette to select the gray shade or color you need before applying it with the paintbrush tool. Better still, use the program's *eyedropper* or *pickup* tool—point to a spot adjacent to the scratch, then click, and the program automatically selects the gray shade or color you need (see "Pick Me Up").

One classic drawback of bitmapped graphics programs is that the edges of shapes you draw appear jagged, especially when laser printed. Image processing programs eliminate this drawback through *antialiasing,* which smooths jaggies by adding shaded pixels. Most programs can apply their antialiasing talents to text if you have Apple's TrueType or Adobe Type Manager (Photoshop includes the latter). But text is still a second-class citizen in most image processing programs. You can't edit or reformat it as you can in a draw program such as Claris's MacDraw, Adobe Illustrator, Aldus FreeHand, or Deneba's Canvas. If you need to add a lot of text to an image, import the image into a draw or page-layout program. ColorStudio's 1.5 includes a software add-on called Shapes, which provides text-editing and drawing features.

Selecting and Masking

You often need to select part of an image as a prelude to moving or modifying it, but for selecting fine details, the basic marquee and lasso tools aren't enough. One advanced selection tool most image processing programs provide is a *magic wand:* point to a spot and click, and the program selects all connected pixels of the same or similar color or gray shade. You can adjust the wand's tolerance to select a wide range of similar colors or grays or only ones identical to those of the spot you clicked.

One especially powerful selection tool is Photoshop 2.0's *pen.* It lets you select portions of an image by drawing *bezier curves,* those geometric constructions that form the foundation of PostScript illustration programs and type fonts. Like the lasso, the pen tool is best suited to selecting irregularly shaped portions of an image. But the pen allows for far greater precision,

and it lets you fine-tune the selection area by clicking and dragging the curves' *control points*. You can even save the selection paths you draw to reapply them elsewhere in the image or in other images.

In most image processing programs, even the lowly lasso and marquee tools have options that are absent from simple paint programs. You can specify a *feathered* selection, for example—instead of selecting only the pixels within the selection boundary, the program throws in extra pixels on either side of the boundary and fades them (see "A Feathered Friend").

These selection variations help in two ways: when you're modifying parts of an image and when you're creating *masks*. Just as masking tape prevents stray paint from staining woodwork, a mask prevents stray pixels from fouling part of an image. You might use a mask to protect an area adjacent to the spot you're retouching or to add a new background by combining images (see "Moon over Chicago").

No Darkroom Needed

Anyone who has struggled to print a poorly exposed photo in a darkroom will want an image processing program just for its *gamma-correction* features. By assigning different colors or gray shades to each pixel, an image processing program can change the brightness, contrast, and color balance of an image.

For adjusting brightness and contrast, most programs provide on-screen sliders and a window containing a *gray-map* graph, which graphically shows the relationship between the data in the image file and the shades of gray on the screen. You can tailor the gray map by drawing with a pencil tool—and in more advanced programs such as Micro-Frontier's Enhance, with line and curve tools. Most programs let you save gray maps on disk, allowing you to apply them to similarly exposed images in the future. Most also let you apply corrections to only part of the image, a useful feature for bringing out details in a washed-out face. Photoshop and ColorStudio work similarly, except their correction features extend beyond grays to include red, green, and blue—the three colors the Mac mixes to create color images. I'll explore gray-map and color-correction features in more detail in next month's column.

Finally, it's worth noting that high-end color paint programs such as SuperMac's PixelPaint Professional, Electronic Arts' Studio/32, and Deneba's UltraPaint can handle some color and gray-scale image processing tasks, too. All three have sophisticated

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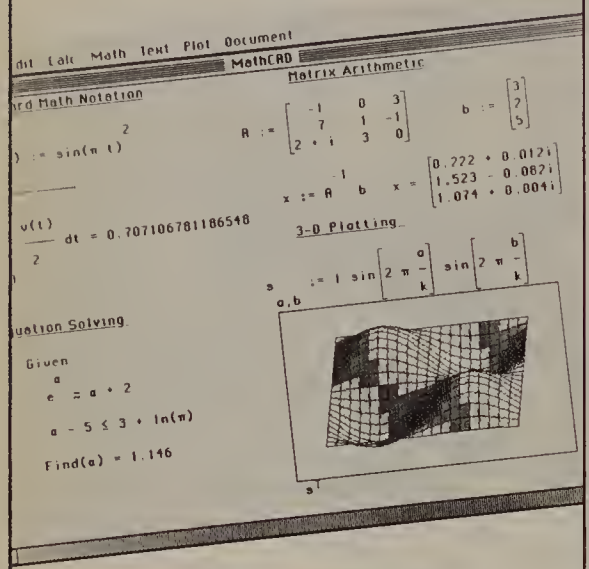

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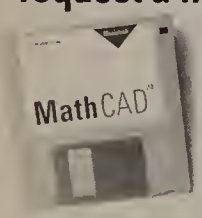

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painting and masking tools, and UltraPaint lets you adjust the brightness and contrast of imported gray-scale images. Fractal Design Painter and Time Arts' Oasis both offer unique painting tools designed to mimic real paint and canvas media.

Displaying, Printing, and Storing

If you're fired up about image processing, a look at its cost and quality may cool you down. To get realistic grays and any color, you need a Mac LC or member of the Mac II family. Some image processing programs run on Classics and Pluses, but these Macs must simulate shades of gray by *dithering,* or combining patterns of dots, making detailed retouching and gray-map adjustments difficult. (Low-end Macs aren't fast enough for many filtering and resizing tasks, either.) And for realistic color, you need a 24-bit color board such as Apple's Macintosh Display Card 8•24 GC, Radius's DirectColor/24, or RasterOps' Video ColorBoard 364. For color at a realistic speed, use a *graphics accelerator* such as SuperMac Technology's Spectrum/8•24 PDQ. Throw in a large-

(continues)

A FEATHERED FRIEND By specifying a feathered selection, you can create vignette effects such as this one. Feathered selections help minimize jarring transitions when you're pasting one image into another.

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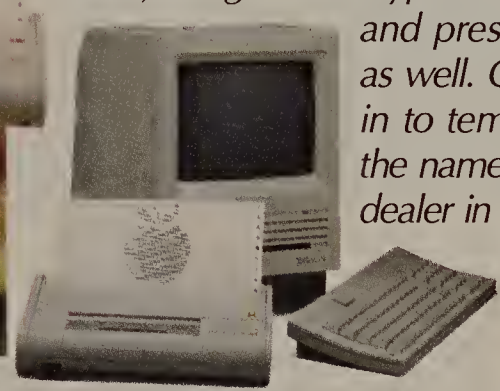

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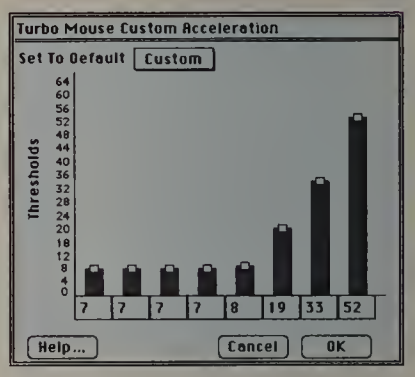

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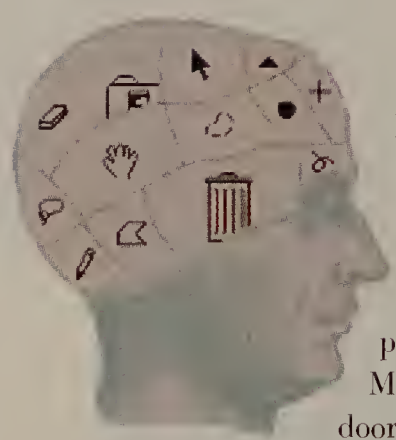

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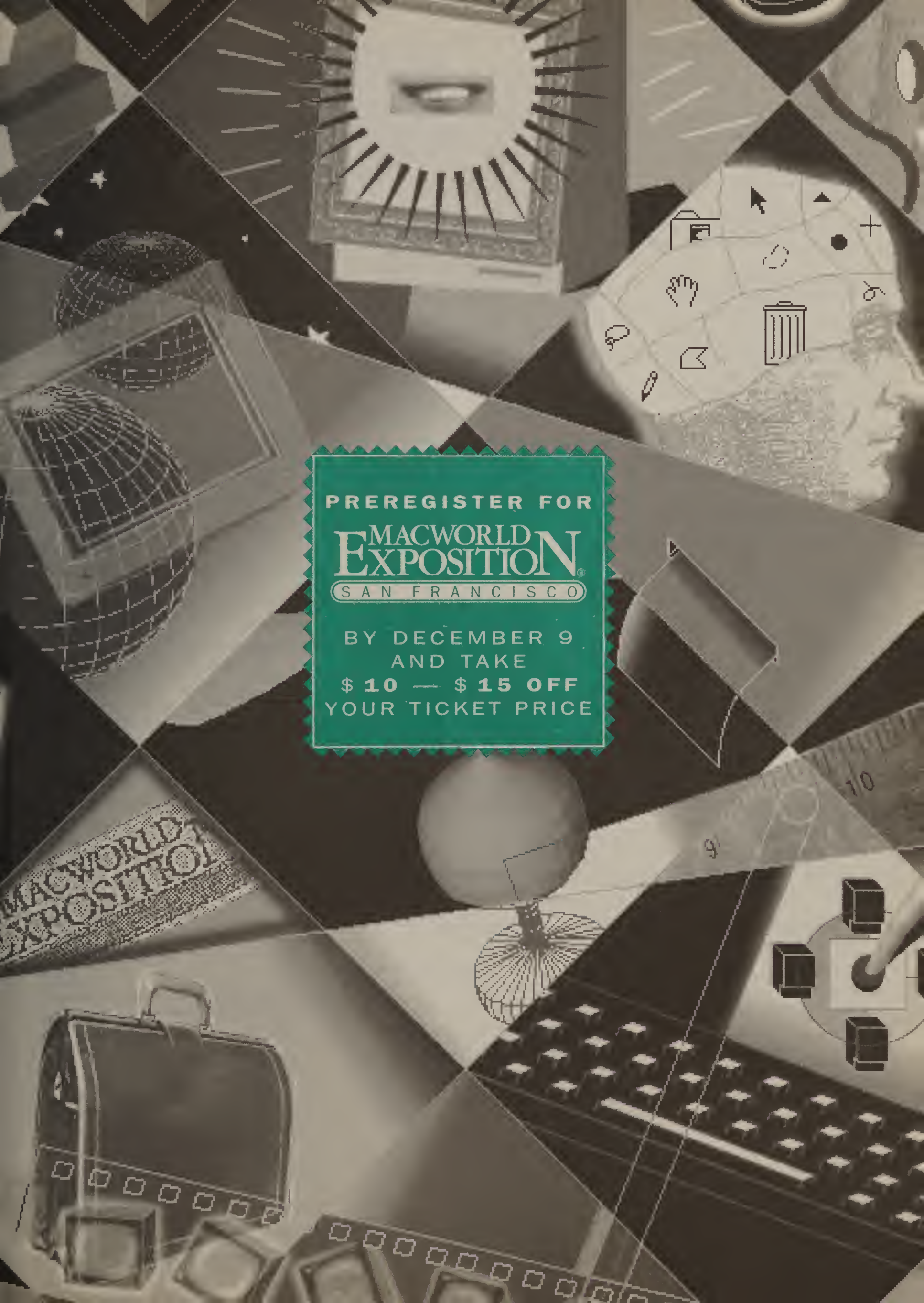
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02. ☐ Manufacturer (computer industry)
03. ☐ Distributor/dealer/retailer/service
04. ☐ Business
05. ☐ Legal services
06. ☐ Communications/publishing
07. ☐ Education
08. ☐ Government
09. ☐ Consultant
10. ☐ Transportation
11. ☐ Information services
12. ☐ Utilities
13. ☐ Engineering
14. ☐ Health services
15. ☐ Other (specify)

Your Title
16. ☐ CEO/president/owner
17. ☐ DP/MIS manager
18. ☐ Manager/department head
19. ☐ Network manager
20. ☐ Programmer/analyst
21. ☐ Engineer/research & development
22. ☐ Consultant
23. ☐ Marketing/sales
24. ☐ Educator
25. ☐ Art director/graphics
26. ☐ Editor/writer
27. ☐ Other (specify)

Size of Your Organization (number of employees national and international)
28. ☐ Under 50
29. ☐ 50-99
30. ☐ 100-499
31. ☐ 500-999
32. ☐ 1,000-5,000
33. ☐ Over 5,000

Which personal computer(s) do you own/use?
34. ☐ Macintosh Classic
35. ☐ Macintosh Plus
36. ☐ Macintosh SE
37. ☐ Macintosh II
38. ☐ Macintosh
39. ☐ Macintosh LC
40. ☐ Macintosh IIsi
41. ☐ Macintosh IIci
42. ☐ Macintosh IIfx
43. ☐ Apple II Series
44. ☐ IBM PC (or clone)
45. ☐ None
46. ☐ Other (specify) _____

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MW1191

The Programmer/Developer Forum. The ultimate gathering place for veteran and novice Mac techies to share their latest brainstorms.

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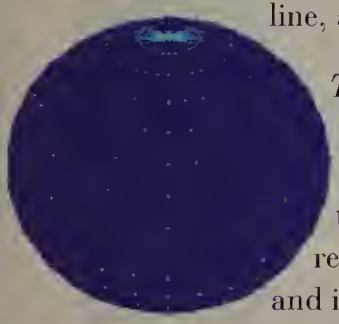
The Connectivity Conference. New! Discover how organizations are solving connectivity problems. Learn how networking can impact business, the bottom line, and the Mac.



The Advanced User Conference. Experienced users share their expertise to reveal hot new ideas and insider's tricks.

The How-to-Get-Started Conference. Complete guidelines for those who are brand-new to the Mac, or need a concentrated lesson on popular Mac applications.

The You-Asked-for-It Conference. Fact-filled sessions responding to special requests and special interest groups — health care, legal, real estate, home office/-small business, user groups and more.

The Big Business Conference. New! Eight sessions dedicated exclusively to solving the problems of Mac users in large organizations, with a heavy focus on connectivity.

The Education Conference. The greatest show-and-tell on earth! Administrators and teachers—from kindergarten to grad school—can discover why the Mac is the best education tool in classrooms everywhere. Study the pluses of computer literacy and how certain programs can help expand minds and open new horizons to learning.

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San Francisco, CA 771-1400
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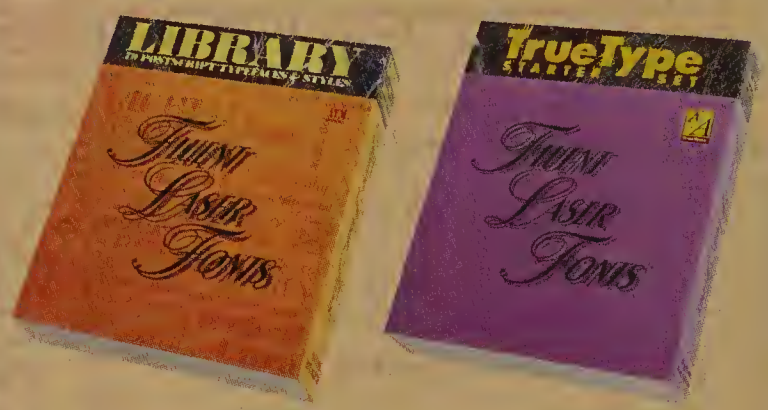

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- Sans Serif Bold
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- Sans Serif Bold Condensed
- Sans Serif Bold Condensed Italic
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Circle 137 on reader service card.

MOON OVER CHICAGO Io, one of the moons of Jupiter, rises over Chicago. This composite was created using a mask. Above: the moon, with a slightly feathered edge. Top right: the mask for the skyline. Bottom right: the moon pasted into position. The mask protects the buildings, enabling the moon to appear behind them.

screen monitor to avoid constant scrolling.

Images that look realistic on screen look coarse when laser printed. Because of *halftoning*—the simulation of grays with black dots of varying size—laser-printed results look only about as good as a newspaper photo. Some upcoming developments promise to improve the quality of laser-printed halftones, but to get the best results, print images on a local service bureau's *imagesetter,* which can produce magazine-quality screens of 120 lines per inch and up.

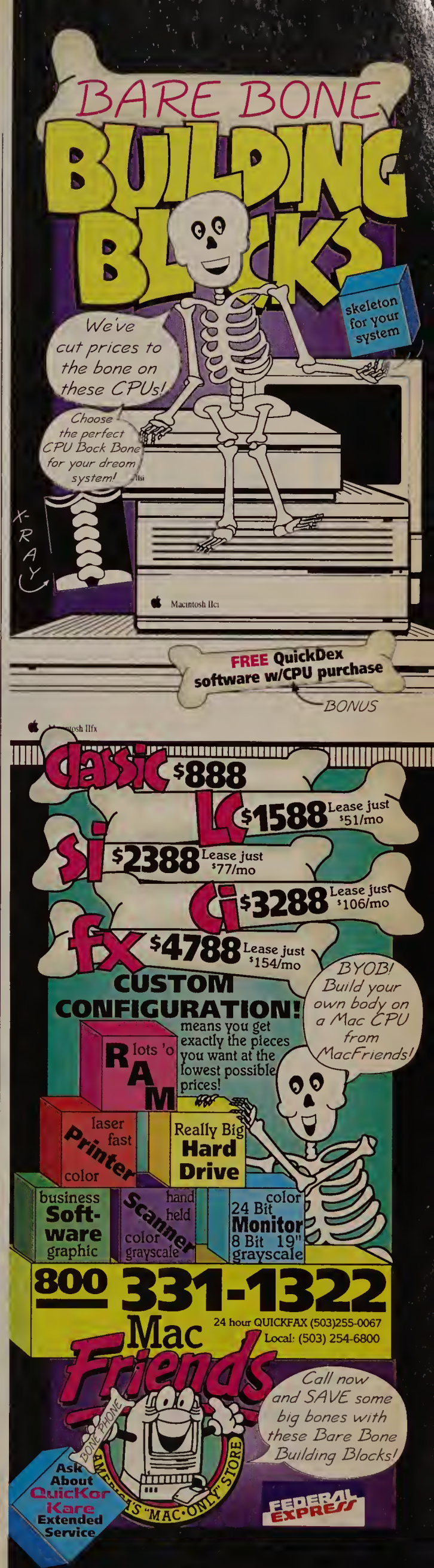
Finally, you need to find room for all those bits that represent images. A 5MB Mac is adequate for gray-scale work, but 8MB is better, and all but essential for color work. As for storage space, you'll need it—a gray-scale image can gobble up half a megabyte and a large color file can consume ten times that. Serious image processors favor removable-media drives such as those made by SyQuest and Iomega over conventional hard drives (see "Expansion Made Easy," May 1991). Another solution is *compression* software, and in some cases hardware, that reduces space requirements. You can also reduce space requirements by fine-tuning your scanner settings to obtain the best quality at the lowest possible scanning resolution.

Practice and experience are the keys to getting quality results from

scanners and image processing programs. Image processing is still a specialized endeavor, and the hardware is evolving rapidly. But most publishing pros agree that high-quality image processing on the Mac has finally arrived. ■

See Where to Buy *for contact information.*

Contributing editor Jim Heid looks at a different aspect of Macintosh fundamentals each month. His latest book, Macworld Complete Mac Handbook *(IDG Books Worldwide, 1991), is an updated and expanded collection of more than 40* Getting Started *columns.*



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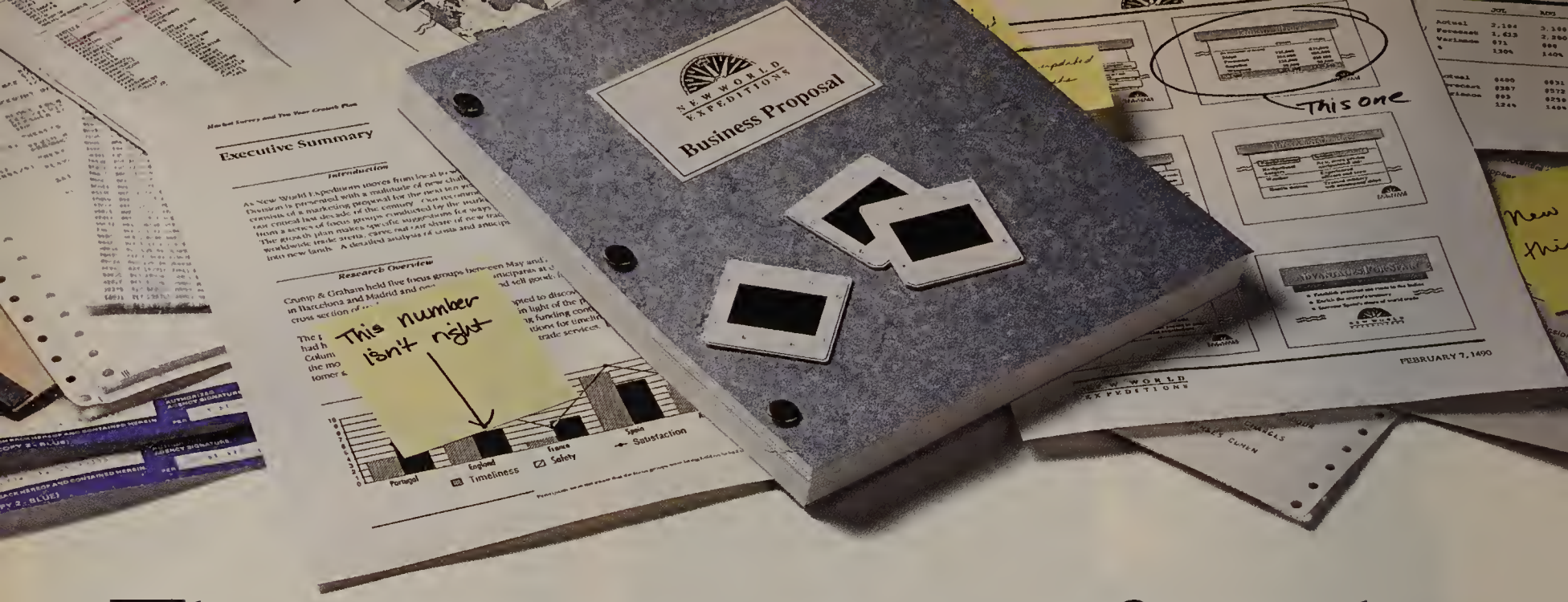

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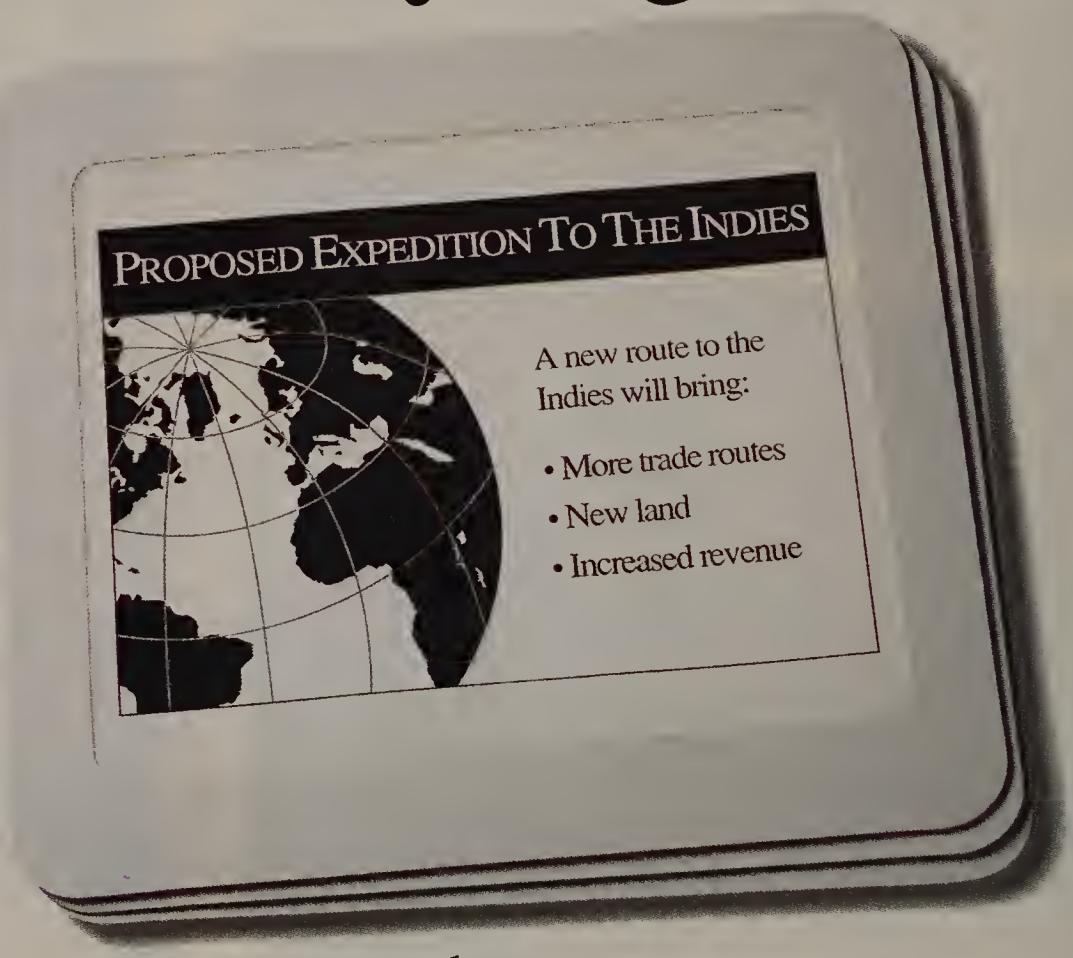

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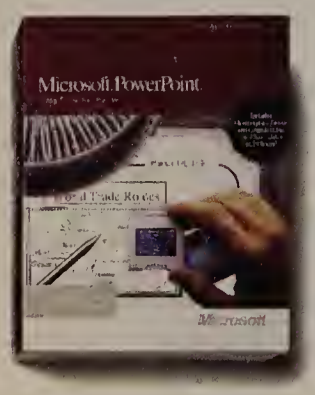

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Aldus FreeHand Aldus Corp.; 206/628-2320.
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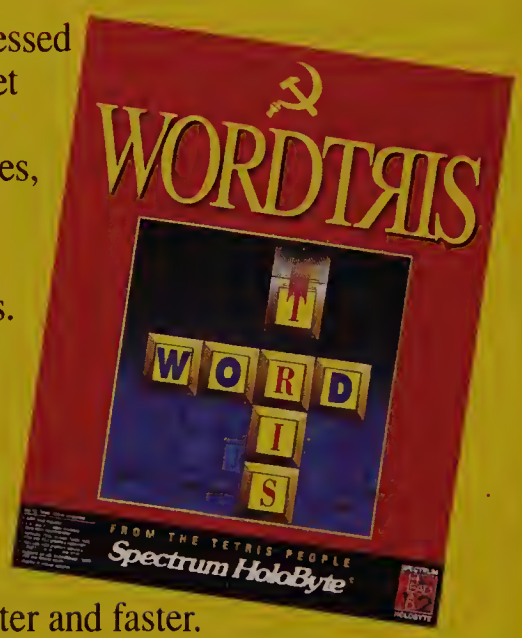

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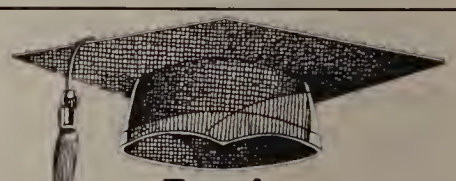

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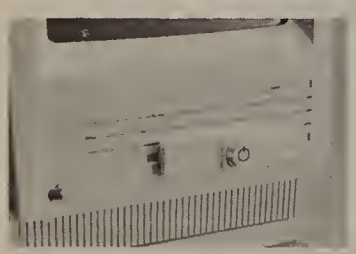

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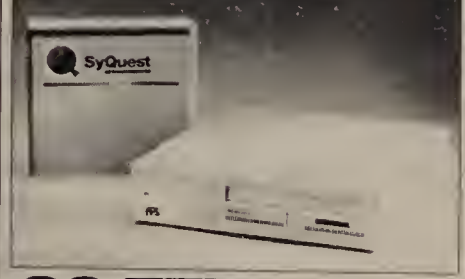

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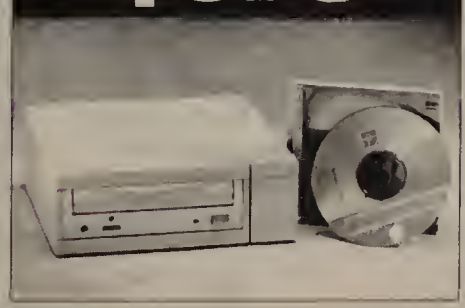

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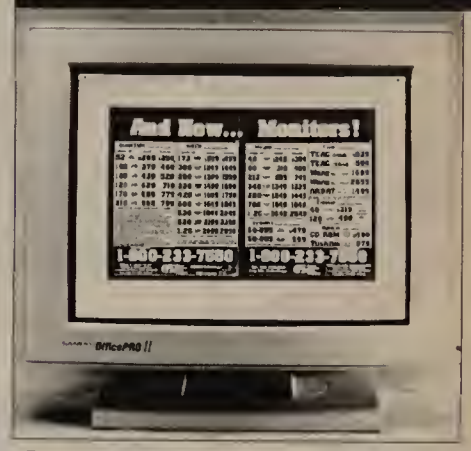

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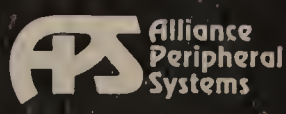

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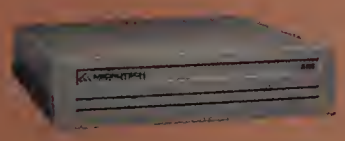

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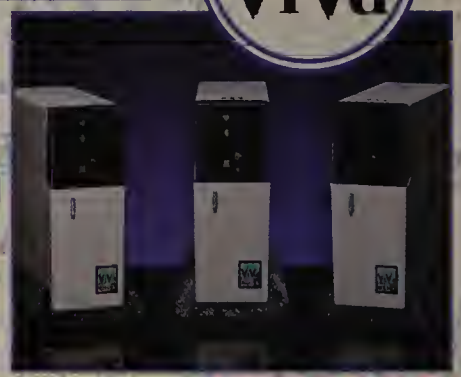

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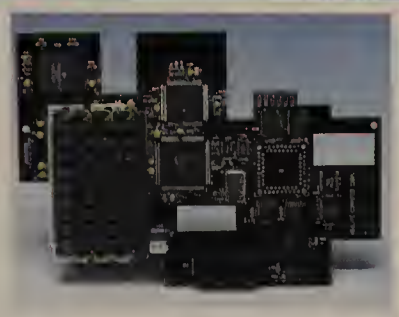

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Infinity 88 Turbo	**$1095**

Bernoulli

44mb/90mb	***Call!***

E-Machines E16 $1195

Optical Cartridges

$125

512K & 1024K

DayStar Digital

NEW!!!

ONE CARD FITS ALL!! INCLUDING THE IIsi, LC & SE/30

DayStar again leads the Mac world by delivering incredible power, convenience and cross-platform transportability for the Mac. Buy ***one card*** now and transfer it to your new Mac when you trade up. Triple your performance. Optional math coprocessor available.

PowerCache 25 MHz, 40MHz & 50 MHz available for Mac II, IIx, IIci, IIcx, IIsi, LC, & SE/30!

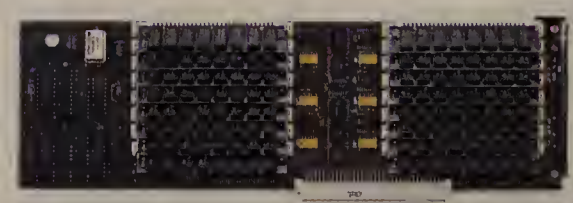
PowerCache 25 MHz	**$699**
PowerCache 40 MHz	**$895**
PowerCache 50 MHz	***Call!***
SCSI PowerCard	**$995**

NOW!!

A CACHE CARD FOR BOTH THE IIci & IIsi!

FastCache IIci & IIsi	**$269 & $305**

RAM PowerCard



For those already running at full speed, DayStar has the RAM PowerCard to make your disk intensive tasks ***scream!*** Place up to 16 standard 1 Meg, 4 Meg or 16 Meg SIMMs on the PowerCard for up to 256 Megs of memory on this NuBus card. You can also chain multiple RAM PowerCards together for even larger projects. The RAM PowerCard is perfect for data bases, imaging, multi-media and optical drives.

RAM PowerCard	**$699**

Monitors

E-MACHINES

E16 (IIsi, IIci & LC compatible) *$63/mo**	**$1195**
E16 w/XL8	**$1990**
T16 w/Card	**$1895**
Ikegami	
CT20" Trinitron w/8 bit card	**$2565**
CT20" Trinitron w/24 bit card	**$3295**
RasterOps **Systems**	***Call!***
Seiko **14" & RasterOps 24S**	**$979**
Sigma **L-View Multimode (Low EMF)**	**$1299**
SUPERMAC Systems	***Call!***

E-Machines T16/XL24 $2795

CD • ROM

CHINON	**$569**	**NEC Portable**	**$495**
PLI (Sony)	**$695**	**CDR-73**	***Call!***

Hard Drives

HARD & FAST RULE: BIG, FAST, HARD DRIVES COST LESS AT MACCENTER

Wren *(5.25, Full Height)*	*Int*	*Ext*
330 *(385NM-Runner)*	**$1325**	**$1495**
600 *(702NM)*	**$1495**	**$1595**
630 *(766NM)*	**$1545**	**$1695**
660 *(767NM-Runner)*	**$1895**	**$2095**
1 Gig *(1200NM)* *$87/mo**	**$2295**	**$2495**

Prices include brackets or metal cases, cables, formatting software & 15 meg shareware.

Quantum

	Int	*Ext*
105LPS	**$399**	**$499**
210	**$699**	**$799**

IDS Livingstone

Clipper 20 Meg	**$399**
Clipper 40 Meg	**$499**

MacCenter also carries Hewlett Packard, Maxtor and Micropolis drives. Call for pricing.

Advantages Of Dealing With The Center Of The Macintosh Universe

- ***We accept MasterCard and Visa*** with no surcharge and no minimum.
- ***Your credit card is not charged*** until your order is shipped.
- ***We accept personal checks,*** company checks, money orders and cashier's checks. Money orders and cashier's checks clear immediately; please allow ten days for personal and company checks to clear.
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- ***Shipping:*** US shipments (including Alaska and Hawaii) are by UPS and Airborne Express. Canadian shipments are by Airborne Express and TNT. Foreign shipments are delivered by the most cost effective delivery service. We will ship by any other carrier, at a customer's request.
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- ***All prices, promotions and product availability*** are subject to change without notice. We regret we cannot be responsible for typographical errors and cannot guarantee compatibility of all products.
- ***Send in your reader service*** card and get a free catalog.
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"The Magic 45 is one of the best SyQuest drives available, offering high speed and high quality."
★★★★ - MacUser

"The low price leaders are the MagicTape 60 and MagicTape 150, from MacProducts."
★★★★½ - MacWorld

MagicTape 60
"Fastest in it's class"
- MacUser

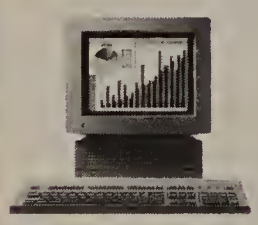
MagicTape 1.3
"The winner in the DAT (1.3GB) category"
- MacWorld

Since 1985 MacProducts USA has been providing software and peripherals to the Macintosh community. In fact, no single company has been shipping Macintosh hard drives longer than MacProducts USA. Backed by a two year warranty and the MacProducts 30 day money back guarantee, MagicDrives are the safest bet in the business. As if that wasn't enough, MacProducts USA offers an optional overnight replacement warranty on all Magic hard drives, removables, and tape backups. That's Magic.

Affordable Macintosh System Sales and Leasing

Macintosh Systems

	BUY	LEASE
THE NEW MAC'S! Call for pricing!		
Mac Quadra 700 –The desktop 040		
Mac Quadra 900 –The Tower 040		
Mac Classic II –68030 Classic		
Mac PowerBook 100 –68000 Notebook		
Mac PowerBook 140 –16 MHz 68030		
Mac PowerBook 170 –25 MHz 68030		
Macintosh Classic		
Includes keyboard		
1MB/ 40MB HD	$1140	$34
4MB/ 40MB HD	$1240	$37
4MB/ 105MB HD	$1409	$42
Classic + Stylewriter	$1469	$44
Classic + Personal LW LS	$1999	
Macintosh LC		
Includes keyboard		
2MB/ 40MB HD	$1949	$59
4MB/ 40MB HD	$2034	$61
4MB/ 105MB HD	$2249	$68
4MB/ 210MB HD	$2679	$80
Mac LC + 12" Apple RGB Color Monitor and Apple Stylewriter	$2299	$69
Mac LC + 13" Apple RGB Color Monitor and Apple Stylewriter	$2629	$79
Mac LC + 13" Apple RGB Color Monitor and Personal Laserwriter LS	$3153	$95
Macintosh IIsi		
3MB/ 40MB HD	$2655	$80
5MB/ 40MB HD	$2745	$83
9MB/ 105MB HD	$3099	$93
17MB/ 105MB HD	$3470	$104
Macintosh IIci		
5MB/ 40MB HD	$3699	$111
5MB/ 40MB HD	$3879	$117
32MB/ 105MB HD	$4469	$134
32MB/ 105MB HD	$5180	$156
32MB/ 210MB HD	$5610	$168
Macintosh IIfx System		
Call for latest competitive pricing		

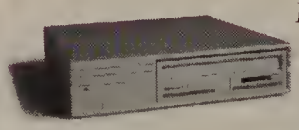


- Buy 2 Mac IIsi's or IIci's and save $200!
- Buy 3 Mac IIsi's or IIci's and save $400!

Hard Drives and Storage

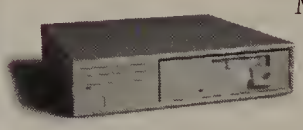
*MagicDrive Extended Warranty Available $75/ year

	BUY	LEASE
Drive mechanisms. 2 year warranty.		
40MB Hard Drive	$199	$6
52MB Quantum low profile	$239	$8
105MB Quantum low profile	$369	$14
170MB Quantum	$730	$22
210 MB Quantum	$799	$24
300MB Seagate*	$1399	$45
300MB Wren Runner*	$1650	$54
600MB Seagate*	$1899	$60
600MB Wren Runner*	$2199	$69
1.2GB Seagate*	$2695	$85
External Case Kit $99 • Internal Kit $29		



Magic Removable Drives

	BUY	LEASE
Magic SyQuest 45R	$449	$14
Magic SyQuest 88R	$799	$24
SyQuest Cart 45/88	$69/$149	$2
1 GB Tahiti Maxtor	$3995	$120
600 MB Ricoh ISO	$2599	$78
600 MB Sony ISO	$3199	$96



MagicTape Backup

	BUY	LEASE
Includes Retrospect. 2 year warranty.		
MagicTape 150MB	$699	$21
MagicTape 525MB	$999	$30
MagicTape 1.3GB DAT	$1695	$51
MagicTape 2.0GB DAT	$1895	$57
MagicTape 2.4GB 8mm	$2895	$87
MagicTape 5.0GB 8mm	$4499	$135

CD ROM Drives

	BUY	LEASE
Magic CD ROM (Toshiba)	$529	$19
Many CD-ROM software titles available!		

Storage Options

	BUY	LEASE
Bernoulli Removable 90	$969	$29
Pinnacle REO130 Optical	$2629	$81
PLI Infinity Turbo 88	$1149	$41
Micronet 88 Removable	$1099	$36

MagicDrive Accessories

	BUY	LEASE
Double-Up compression	$175	$6
Magic SCSI II Accelerator	$899	$27

UK FAX 800-891-742 • Singapore 65-287-5181 • Canada 800-624-9307 • USA 1-800-622-8721

LEASING: Prices quoted reflect 48 month lease based on credit approval. Minimum $50 month lease. Terms available from 24 to 60 month periods.

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Modems & Fax Modems

	BUY	LEASE
Magic 2400/1200/300 baud modem. 100% Hayes compatible. Includes 2 year warranty.	$69	$3
Magic 2400/9600 SendFax modem 100% Hayes & Group 3 compatible Includes 2 year warranty	$99	$3
Magic 2400/9600 FaxModem 100% Hayes & Group 3 compatible Includes 2 year warranty	$149	$6
Magic 2400 V.42 Bis MNP-5 Modem 2400 V.42 bis MNP-5 Modem. Transmit data up at speeds up to 9,600 baud. Includes 2 year warranty	$149	$5
Magic 9600 V.32/V.42 bis MNP-5 Modem Transmit data at speeds up to 38.4k baud. 2 year warranty	$399	$12

Magic 9600
V.32/V.42 Modem
Software & Cable
$399

Magic CPU & Printer Memory

1 MB SIMMs from
$35
Lifetime Guarantee

	BUY	LEASE
1MB SIMMs 60 – 120ns	$35	$1
2MB SIMMs	$79	$2
4 & 16MB SIMMs	$179/$899	$6
MAC LC 8-bit Video RAM	$79	$3
Portable RAM 1-8 MB	Call	Call
Classic Upgrade 2MB	$49	$2
Classic Upgrade 4MB	$99	$3
GCC PLP II/S 1MB	$69	$2
GCC BLP II/IIS 2MB	$139	$5
HP 1/2/4MB	$99/$179/$239	$3
LZR 960 2/4/8MB Upgrade	Call	Call
QMS 2/4MB	$199/$359	$6
TI 1MB RAM Upgrade.	$75	$3

Magic Accelerators

Magic RailGun 030
"IIci computing power in a Plus"
–MacUser

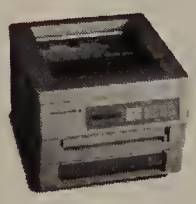
NEW! TokaMac 040 Accelerators starting at only $2099 for the LC, SE/30, IIsi, & IIci

	BUY	LEASE
RAM-disk, improved SCSI throughput. Available math coprocessor. 1 yr warranty. Available for the Plus, SE, & Classic. Coming Soon- RailGun LC		
MagicCache IIsi, SE/30	$259	$9
MagicCache IIci	$169	$5
Magic RailGun030 16 MHz	$449	$14
Magic RailGun030 25 MHz	$699	$21
Magic RailGun030 33 MHz	$999	$30
16 MHz 68882 coprocessor	$99	$3
MagicMath LC Coprocessor	$99	$3
Accelerators/Cache Cards –all models!		
DayStar PowerCache IIci 40MHz	$1119	$34
Radius Rocket 040	$2599	$78

Networking & Connectivity

Asante 10T Hub	$935	$28
DaynaPort E/LC, SI, SE	$285	$9
Nuvotech Nuvolink II	$279	$9
Shiva FastPath 4	$2089	$63
Sonic Ethernet TnT SE,II,LC,IIsi	$235	$7
Magic Networking Solutions		
MagicNet (localtalk)	$19	$1
Magic EtherNet	$249	$8

Printers



TI microLaser
PS/17 $1319
PS/35 $1649

Apple StyleWriter	$439	$14
HP DeskWriter	$529	$16
QMS PS 815	$3999	$120
Dayna EtherPrint	$359	$11
GCC Laser Printers	Call	Call
JetInc. Deskwriter/Stylewriter Refill		$11.
Seikosha SP2000 Dot Matrix	$209	$61
We carry NEC, Abaton, Mictotek, & More!		

Video Solutions

MagicView 20" Trinitron monitor $2099

Magic 20" 24-bit color card $1299

NEC MacSync 14" RGB	$419	$15
GoldStar 1450+ 14"RGB	$369	$12
Radius Color Pivot	$1399	$42
RasterOps 24 STV	$1289	$39
Seiko CM1445 14" RGB	$619	$19
Magic Video Solutions		
Magic 19" B&W	$999	$30
Magic 19 or 20" 24-bit card	$1299	$39
Magic 13" 8-bit color cd II	$269	$9
Magic 19" or 20" 8-bit card	$499	$15

Software

Quark XPress $489

System 7 $90

Aldus Gallery Effects	$239	$7
Claris Resolve NEW!	$289	$8
FileMaker Pro	$199	$6
Liaison	$269	$8
Microsoft Word	$271	$9
MiniCAD +	$499	$15
Mode32	$105	$4
Norton Utilities	$87	$3
PageMaker 4	$489	$14
PhotoShop 2.0	$569	$17
Soft PC/AT EGA Bundle	$329	$10
Symantic Anti Virus 3	$64	$2
Symantic Utilities Mac	$95	$3
Warner Beethoven CD ROM	$42	$1

Scanners

Caere Typist Hand Scanner	$479	$14
MicroTek 1850 SlideScan	$2150	$65
Microtek 600ZS	$1649	$49

To Order Call: 1-800-622-8721 or (512) 472-8881
Hours: M-F 8am-9pm Sat 10am-6pm
Cust. Service (512) 472-8881 ext 631
Tech. Support: (512) 472-8881 ext 628
24 hr Fax Line: (512) 499-0888

Intl. Orders: Call or fax **Leasing:** Yes! Flexible terms & quick approval make it easy to lease. **Tax:** Texas Residents add 8%

VISA MasterCard DISCOVER

Payment: Visa, Mastercard, Discover. Your credit card is not charged until your order is shipped! Wire transfers, approved company and institutional PO's. (Net 15). $5 charge for COD, cashiers checks.
Shipping: Airborn. $10 min shipping charge. All major carriers available.
Returns: Returns require RMA #. Please call (512) 472-8881. Ext 625. All returns subject to a restocking fee. Shipping and handling not refundable.

Opened software is not returnable. All Magic products (except memory) carry a 30 day money back guarantee (call for details). **Terms:** Item availability and price subject to change without notice. Some products subject to back order.

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Austin, Texas 78705

November 91

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24 HR FAX 512-499-0888
Circle 175 on reader service card

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Lowest Prices ▪ Overnight Delivery only $3 ▪ Money Back Guarantees*

Accessories

ABCOM
- CARRY CASE CI, CX,SI, IMGWTR 82
- CARRY CASE SE/PLUS EXTEND KBD 86
- DUST COVER FOR CLASSIC, PLUS OR SE 15

CACHE-IN $185

Boost your IIci's speed by up to 40% with AE's low-cost/high performance cache card, Cache-In. Cache-In uses a technique known as RAM caching to eliminate the time that the CPU waits for information to be retrieved from the motherboard (wait states). Its small size allows room for mass-storage 5.25: hard drives.. Includes CDEV for turning the card on and off. Cache-In provides a lot of performance for a little cache. 5 yr. warranty.

APPLIED ENGINEERING
- AE HIGH DENSITY 3.5 MAC DRIVE 225
- QUADRALINK 199

ARTICULATE SYSTEMS
- VOICE LINK 152
- VOICE NAVIGATOR II 545
- VOICE IMPACT 81
- VOICE IMPACT PRO 175

FARALLON
- MACRECORDER 2.0 164

KEYTRONICS
- MACPRO PLUS 139

LOGITECH
- MOUSEMAN 79

MOUSE SYSTEMS
- LITTLE MOUSE ADB or MAC PLUS 74

TRIPLITE
- MACDIRECTOR 88

PHILLIPS & DUPONT
- 650MB OPTICAL CARTRIDGE 146

VENTANA PRESS
- SYSTEM 7 BOOK 19

Communications

ABATON
- INTERFAX 24/96 325

HAYES
- SMARTMODEM 2400 & SMARTCOM 345
- V-SERIES ULTRA 9600 MODEM 782

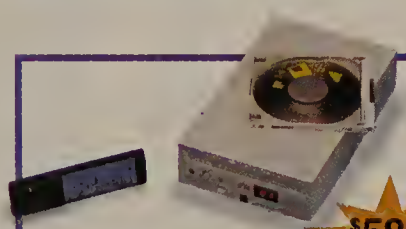
PROMETHEUS
- 24/96MSR FAX MODEM (MAXFAX) 265
- 9600/9600M PLUS V.32/42 MNP5 665
- 9600M-EC V.32/42 MNP 5 665
- PROMODEM 2400 MINI MODEM 115
- ULTIMA14,400 BAUD MODEM/9600 FAX 685

SHARP
- EBR-9600 BAUD MODEM W/MNP5 279

SHIVA
- ETHERGATE 1289
- ETHERPORT 285
- FASTPATH 1985

Storage

CHINON
- CDC-431 CD ROM REMOTE DRIVE 585



CHINON CDC 431 w/REMOTE $585

Chinon's new CDC-431 CD-ROM Drive includes a 12-function audio remote control unit, which allows you to play audio discs without your computer turned on. It offers a rapid access time, rugged construction, small footprint and a full-range volume control...all at an affordable price!

PHOVOS 600GS SCANNER $1725

The Phovos 600GS is the only gray scale scanner that offers true 600 dpi resolution in both horizontal and vertical directions. It provides 256 gray scale, an 8.5"x14" scan area, and comes complete with Adobe Photoshop LE software. An optional 30 page cut sheet feeder complete with Calera Wordscan OCR software is available.

IOMEGA
- BERNOULLI90 MB TRANSPORTABLE 788
- 3-PACK CARTRIDGES (44 MEGS) 265

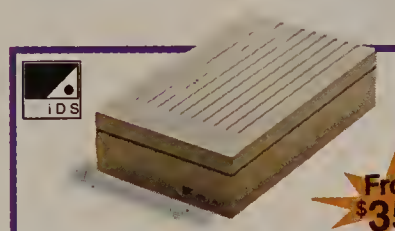
MASS MICRO SYSTEMS
- DATAPAK 45 REMOVEABLE HD 639
- DATAPAK 88 REMOVEABLE HD 999

MICROTECH
- NOVA 200 1175
- NOVA 320 1395

PLI
- 45 CARTRIDGE 79
- INFINITY 40 SINGLE W/CARTRIDGE 659
- INFINITY OPTICAL 3431

Monitors & Boards

APPLIED ENGINEERING
- CACHE IN 185
- FASTMATH LC 129
- QUICKSILVER 265



PRO 105 MB QUANTUM
PRO 130 MB FUJITSU
PRO 200 MB CONNER
WIP/PRO 50MB QUANTUM
REMOVABLE $499

From $355

iDS PRO is a series of portable hard drives designed for high-capacity storage. The Pro is heavy-duty shock mounted in a rugged, scratch-resistant shell. Units weigh less than 3 pounds and come in 20MB to 200MB.

CUTTING EDGE
- DUAL PAGE MONITOR SYSTEM 1025
- FULL PAGE SYSTEM FOR LC 549
- FULL PAGE SYSTEM FOR SE/PLUS 549

E MACHINES
- QUICKVIEW STUDIO 1839
- QUICKVIEW Z21 1839
- T16 COLOR PAGE SYSTEM 1850
- T19 19" COLOR SYSTEM 3599
- TX 16" COLOR SYSTEM 2545

GENERATION SYSTEMS
- MAC CLASSIC 19" MONO SYS 1088
- MAC II 19" MONO SYS 1988

IKEGAMI
- CT20 20" TRINITRON 24 BIT SYSTEM 3489
- CT20 20" TRINITRON 8 BIT SYSTEM 2699

MASS MICRO SYSTEMS
- COLOR SPACE SE OR PLUS 1195
- COLORSPACE IIi 1255
- COLOR SPACE IIFX 1650
- DATAPAK 639
- QUICKIMAGE W/PHOTOSHOP 559

MICRON
- MACROCOLOR II 24 BIT VIDEO CARD 477
- GRAY-SCALE 30 8BIT CARD FOR SE30 84
- COLOR 30 VIDEO CARD FOR SE/30 339
- XCEED IICI CACHE CARD 235

NEC
- MACSYNC HC COLOR MONITOR 379

RASTEROPS
- 24SI ACCELERATED BOARD 598
- 24STV COLOR DISPLAYBOARD 1198
- 8L DISPLAY BOARD 1299
- 24L DISPLAY BOARD 2699
- 19" COLOR TRINITRON MONITOR 2498

Printers/Scanners

ABATON
- LASERSCRIPT LX PRINTER 1599
- SCAN 300 COLOR 1275
- SCAN 300/GS 999

ANIMAS
- TRUE COLOR HAND SCANNER 585

MARSTEK COLOR ARTIST $679

The first of its kind to offer true 18 bit color capture, the ColorArtist provides the user with a range of up to 262, 144 colors, and 64 levels of gray. Ads, brochures, pictures, and drawings can be scanned and saved under TIFF, PICT and TGA file formats, then load your image into the powerful editing software for easy modifications.

BEZIER
- BP 4040 LASER PRINTER 1549

CAERE
- TYPIST 469

CHINON
- DS 3000 COLOR SCANNER 696

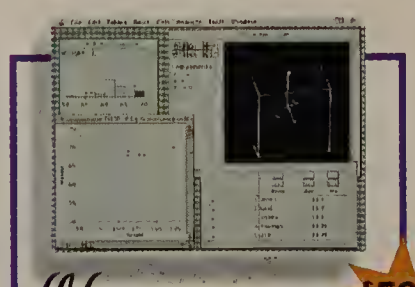
DEST
- PERSONAL SCAN & RECOGNIZE 669
- MACSCAN 3000 990

KODAK
- DICONIX PRINTER 399

LOGITECH
- SCANMAN SCANNER 299

MARSTEK
- MARS 800-MAC 64 HAND SCANNER 299
- COLOR ARTIST HAND SCANNER 679

MICROTEK
- SCANMAKER 1850S SLIDESCANNER 2239
- SCANMAKER 600GS GREYSCALE 1118
- SCANMAKER 600ZS COLOR SCAN 1465
- TRUE LASER/TRUEIMAGE LASER 1795



SAS. JMP 2.0 $589

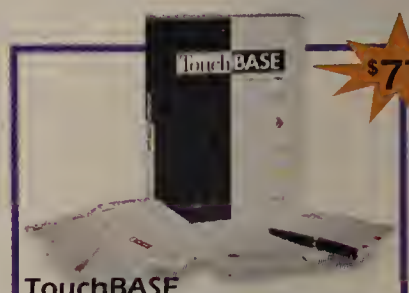
Find out where your data *really* lies and JMP to the right conclusions! JMP 2.0 features *double* the functionality of the original version and provides multi-variate analyses, non-parametrics, non-linear fitting, real time data acquisition, control charts, pareto charts, capability analysis...and much more!

NEC
- COLORMATE PS MODEL 40 4999
- SILENT WRITER 2 MODEL 90 1595

PRIME OPTION
- PHOVOS 600GS GRAY SCANNER 1725
- WORDSCAN OCR SHT. FEEDER BDL 695

OMS
- COLORSCRIPT 100 7795
- OMS PS 810 LASER PRINTER 2999
- OMS PS 410 1925

RELISYS
- TEFAX RA2125 855



TouchBASE $77

TouchBASE is a database designed to help you keep track of personal and business contacts. Use it yourself or take advantage of its multi-user capabilities. Once TouchBASE has organized your contacts, you can print envelopes, labels, address books, fax cover sheets, reports, and more.

TEXAS INSTRUMENTS
- MICROLASER PS17 1284

UMAX
- UMAX COLOR 600 1375

Business

BASELINE PUBLISHING
- DATABASE 1.5 70

CAERE
- OMNIPAGE 3.0 489

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- CLARIS CAD 2.0 625
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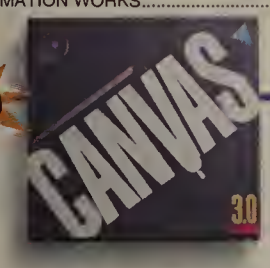

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System 7 savvy, Canvas 3.0 supports Publish and Subscribe, Balloon Help, True Type, and custom Apple Events. Additionally the program offers professional text handling features like character-by-character font scaling, font conversion to Bezier curves, and text wraps inside or outside any shape. Users can blend objects from one shape to another, split or combine objects, simultaneously edit multiple Bezier curve anchor points, or add PMS colors. Canvas 3.0's standard import/export file translators include EPSF, Illustrator 1.1 and 88, CGM, DXF, IGES, PICT1/2, TIFF, MacPaint, StartUpScreen and MacDraw I & II (read only) formats.

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CORRECT GRAMMAR
Correct Grammar for the Macintosh identifies errors in grammar, style, usage, punctuation--even spelling with its 135,000 word dictionary. You can customize Correct Grammar to respect your personal writing style or compare the readability of your writing by sentence, to the education level of your intended audience.

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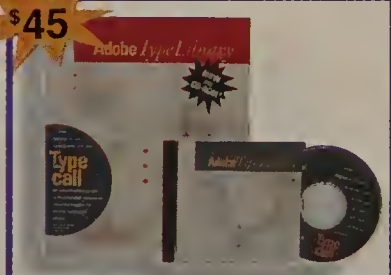

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Monotype's Imprints are a range of single typeface packages offering Macintosh users the only selection of foundry quality type in single typeface packages. These popular headline and presentation typefaces are sold individually, so you only pay for the typefaces you want.

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StrataVision 3D is realistically the best 3D program on the Mac. Already donned with industry awards there's even greater power with version 2.0 Extended modeling gives you more control over objects. Apply realistic textures, set reflectivity and soften shadows with improved ease. Animations of linked objects offer stunning results.

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BP 4040 LASER PRINTER
The BP4040 PostScript laser printer features an AMD 29000, 16MHz RISC-based controller that can process full-page images in a fraction of the time. The BP4040 uses Microsoft's True-Image page description language providing text and graphics processing capabilities, and is compatible with PostScript applications. The BP4040 has HP LaserJet II emulation and 35 printer-resident Apple TrueType fonts are included.

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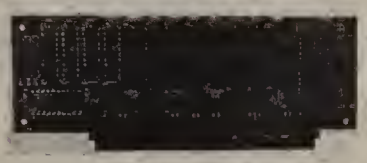
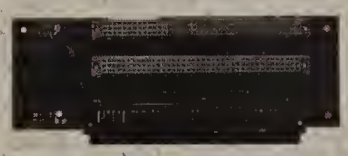
Speed up math calculations on your LC. Up to 40MHz available. Call for pricing.



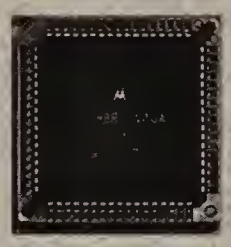
IIsi 64K CacheCard $169

40% performance increase.



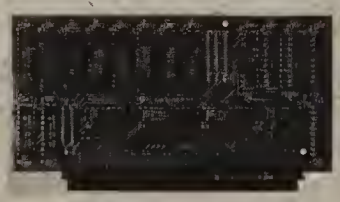
IIsi 030 Adaptor—$59

Use both a cache and an expansion card!



IIsi 20MHz FPU—$75

(Requires slot adaptor.)



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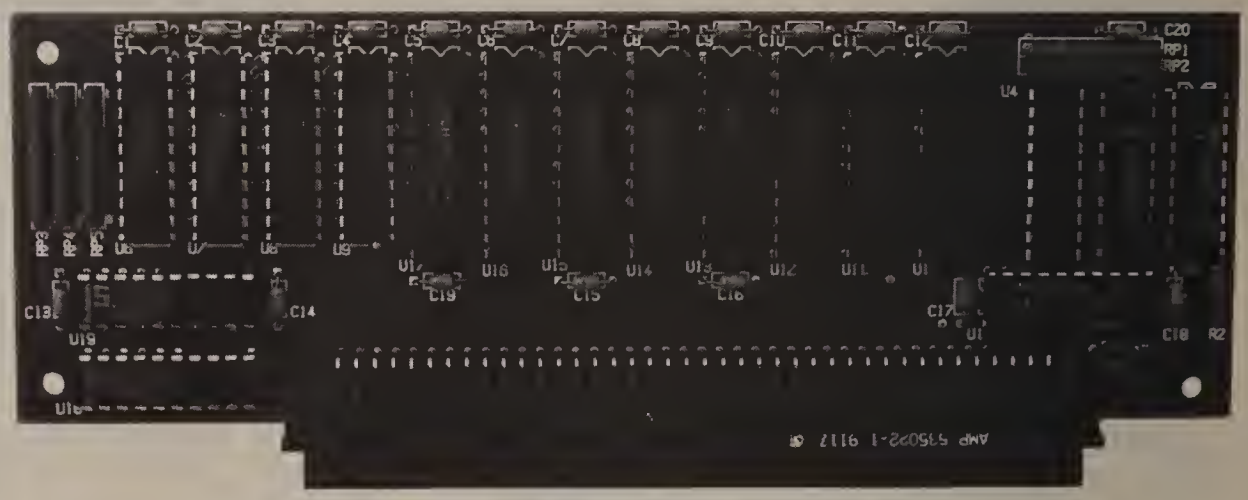
8 & 16Mb SIMMs

For memory intensive applications like Photoshop. For IIci, IIsi, IIfx. Call for pricing.

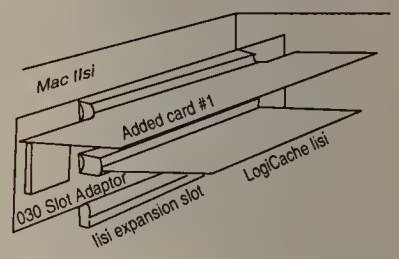
Introducing Logica's Triple Crown for the IIsi. 64K Cache. 68882. '030 Slot Adaptor. Performance. Math Speed. Expandability.



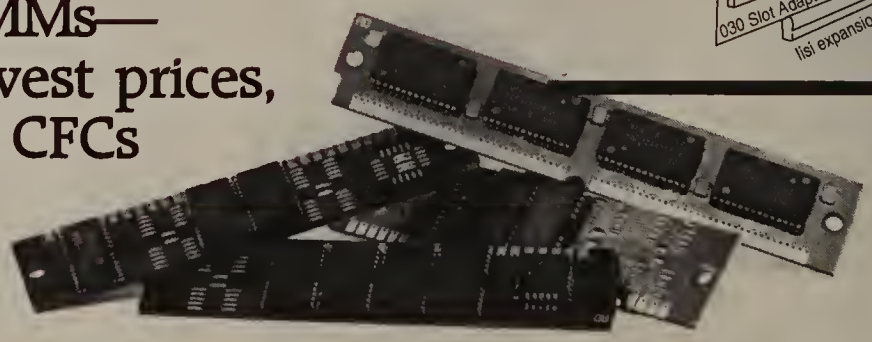
Your IIsi never had it so good! Now with Logica Research's unique new IIsi enhancements, all your options are open. For instance, let's say you want a faster IIsi. Just purchase the LogiCache IIsi 64K— an immediate 40% speed improvement. BONUS—you don't need a slot adapter to use it! It plugs right in your IIsi slot. Best of all, if you need another expansion card (video, Ethernet, etc.) in the future, just purchase the Logica '030 Slot Adaptor—which allows the use of the LogiCache AND the second expansion card! Want faster math speed? Add a 20 MHz 68882 to the Slot Adaptor. You can buy them all at once, or one at a time as your needs grow—no penalties.

IIsi 64K Cache Card	$169
IIsi 030 Slot Adaptor	59
IIsi FPU	75

Make your IIsi faster than a stock IIci with LogiCache IIsi.



SIMMs— lowest prices, no CFCs



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SIMMpack w/1 mb	49
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SIMMpack drive bracket kit*	16

*Remove drive from IIsi and LC, install in Classic.

Third Wave Computing

1826B Kramer Lane,
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(800) 284-0486
(512) 832-8282
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The quickest way to bring 24- bit images to your Mac.

Take a look at the new XAPSHOT still video camera from Canon. XAPSHOT allows you to import high quality still video images to your Mac using a frame grabber. It stores up to 50 images on 2" diskettes and can be connected to your TV for previewing. Great for video, slide graphics and print work. Demo Diskette shipped overnight for only $10.

XAPSHOT	$429
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2" video diskette	$10

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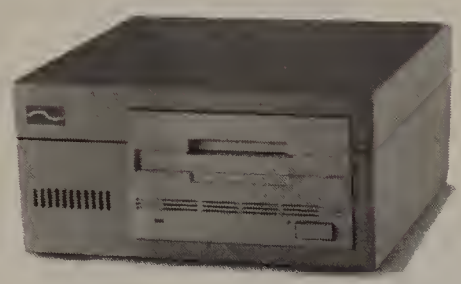

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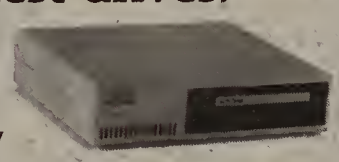

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Third Wave's DATadrive™ with Retrospect—backup an entire network on a single DAT cartridge. Now available with 2 gigabytes of storage.

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**Highest SCSI Evaluator Read/Write of any drive tested, September '91 *MacWorld* review.
***"Quietest drives tested"—March '91, *Macworld* reivew.
****September '91, *Macworld* review.

Circle 156 on reader service card

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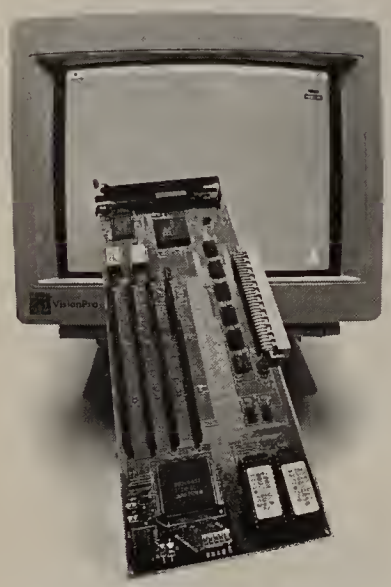
When you



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VisionPro Color Monitor Systems

VisionPro graphic cards are manufactured under license for MacTel. Our SP and SPS cards support multiple monitors, block mode transfer & acceleration, pan/zoom 2x & 4x and virtual desktop. With our monitors, they are an outstanding color solution.

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- 24-bit SP card, 20" Triniton.....$3349

SystemPRO Sony

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- 24-bit SPS card, 19" Sony Triniton (GDM-1950).....$3997
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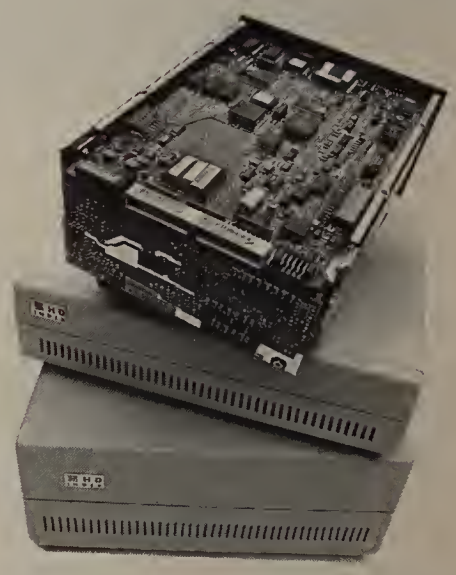
- VisionPro C300, 300 dpi, 8½ x 11" w/ *Adobe Photoshop* $1199



Storage Solutions

MacTel offers you a number of storage and backup solutions, including a complete line of Index hard drives. *MacUser* Labs has rated the MacTel 45R drive (8/91) and the Index 1.2 Gb drive (7/91) 4 mice.

Removable - Optical - Tape

The Index HD formatter is System 7 compatible and supports partitioning, password protection and is A/UX compatible.

- **Index 45R w/1 cartridge** $479
- Index 88R w/1 cartridge $999
  Index 45R and 88R are bundled with ***Backmatic®*** and ***AutoSave®***
- SyQuest cartridge SQ 400.....$69
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New
- 1 GB Tahiti optical drive w/1 cartridge $3699

Index Hard Drives

Quantum drives Index 3.5"

	Internal	External
52 Mb, 12 ms, Slimline	$249	$329
105 Mb, 12 ms, Slimline	$389	$469
210 Mb, 12 ms	$699	$779
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Imprimis drives Index 5.25"

320 Mb, 16ms	$1179*	$1279
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640 Mb, 16 ms	$1499*	$1599
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1.2 Gb, 16 ms	$2299*	$2399

*Mac II and IIx only

New **TelNet** phone net $12.99

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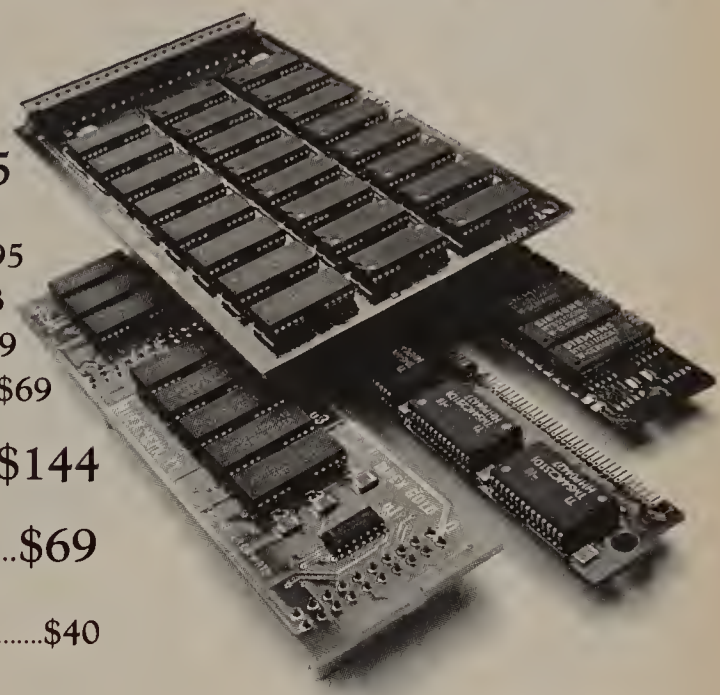
- 1 Mb x 9 SIMM, 70/80 ns.....$43
- 3 Mb Classic memory.....$99
- Mac LC V-RAM upgrade.....$69
- 4 Mb surface mounted SIMM, 80 ns, (IIcx, IIci, IIfx, IIsi and LC) $144
- 1 Mb TI microLaser PS 17/35 & XL upgrade.....$69
- ***Maxima*** virtual memory managment software $40

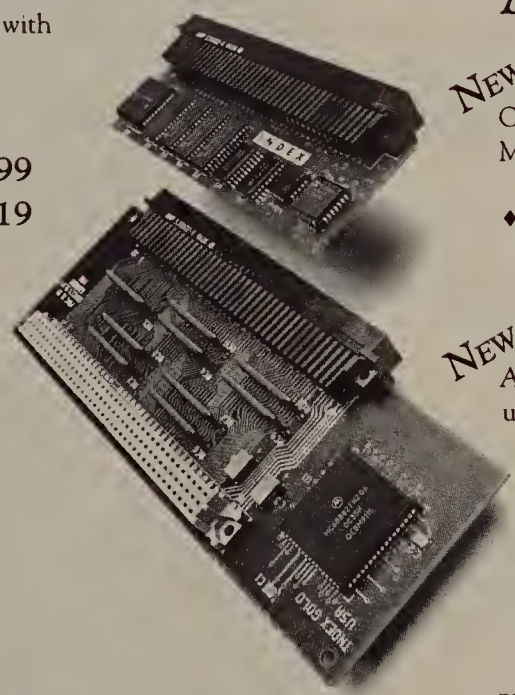


Keyboards

MacTel's Index line of ADB extended keyboards have an 105-key layout, 15 function keys, cursor control keys and number pad. The French, German and Swiss keyboards come with system software.

Index extended keyboard

- English $99
- French, German, Swiss $119



Accelerator Boards

New

On-board 68882/20 MHz math co-processor with adaptor for Macintosh IIsi. Free performance evaluation software included.

- **Index Mac IIsi 030 Direct Slot Interface** $99.00

New

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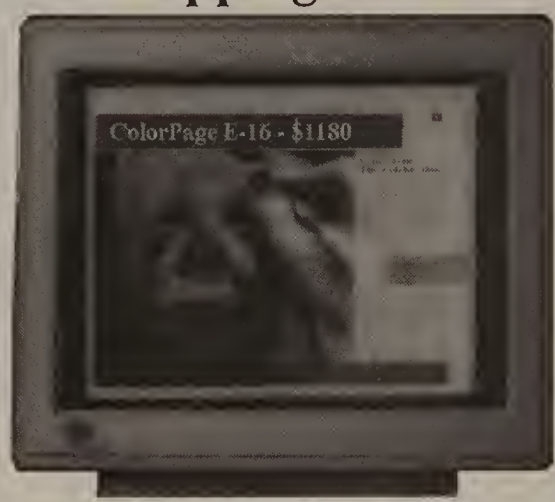

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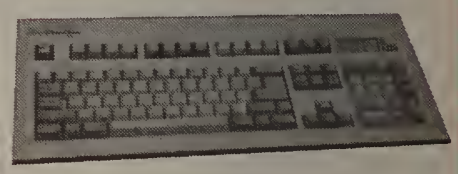

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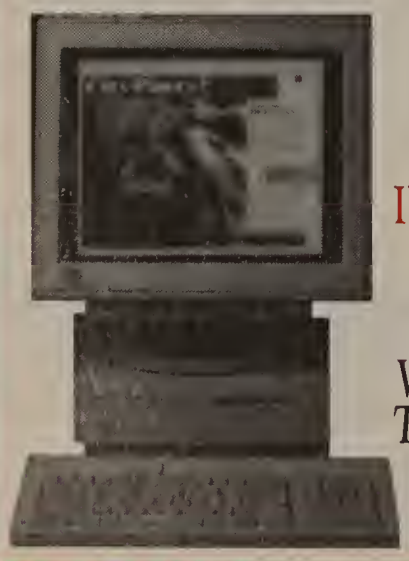

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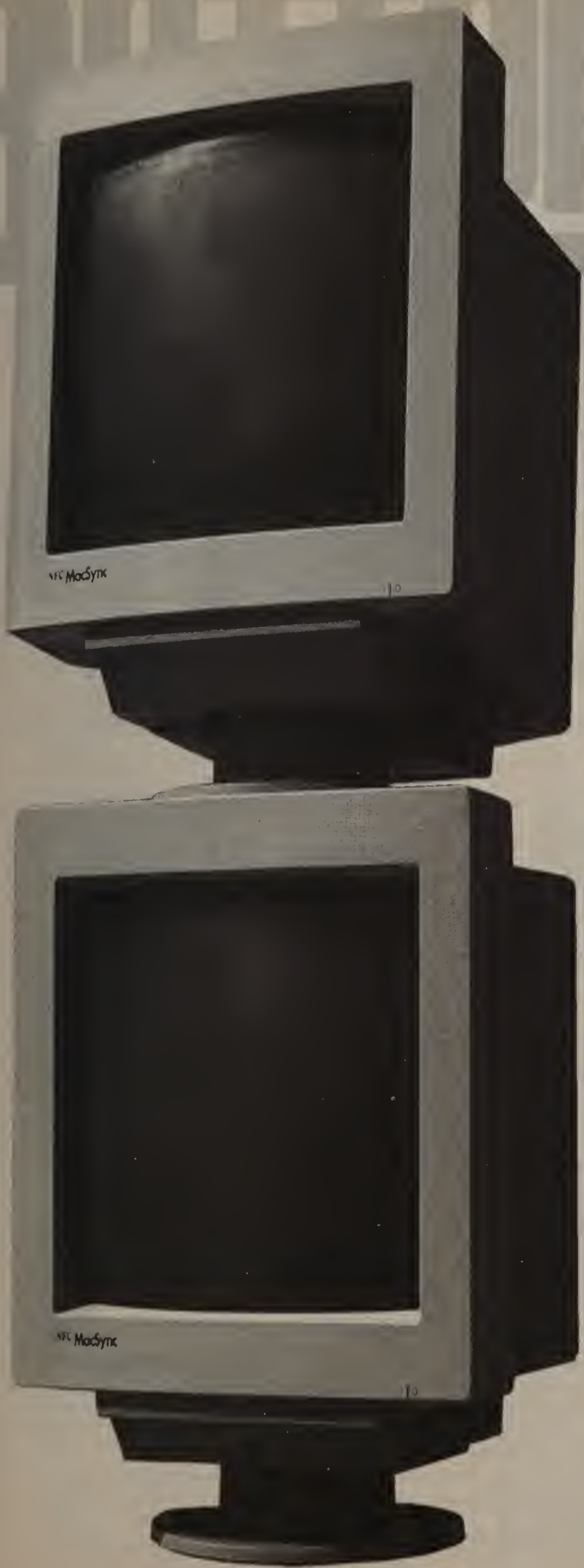

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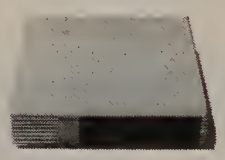

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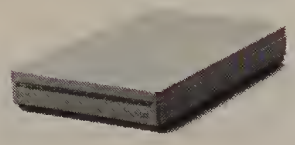

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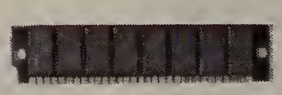

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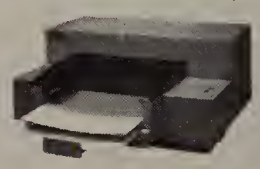

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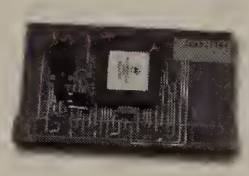

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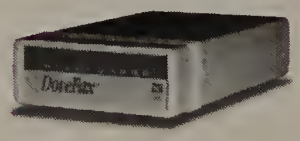

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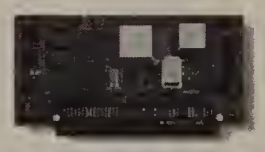

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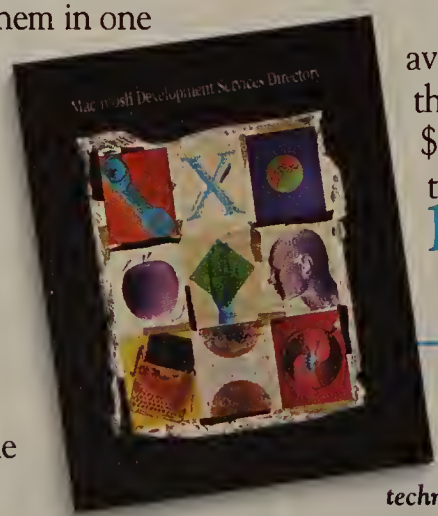

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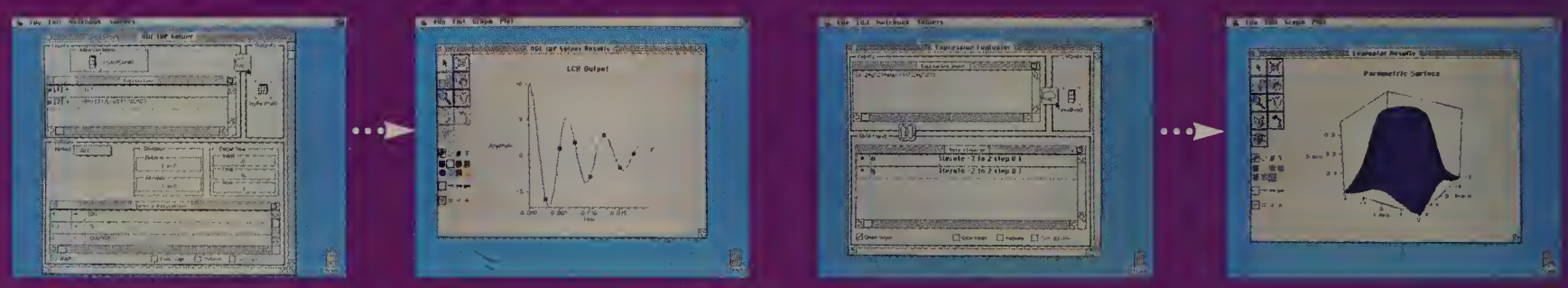

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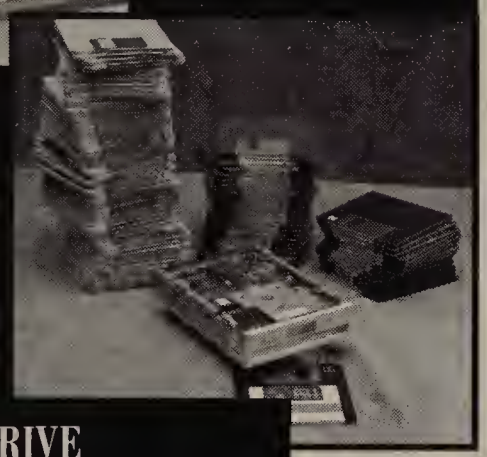

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Macro Power

At the heart of the Macintosh's user-friendliness is its use of pull-down menus to bring the various features of a particular software package under control of the mouse. While this use of menu items is easy and quickly learned, it is not the fastest way to call up frequently used commands. Some programs allow users to access some commands with keyboard equivalents (such as the standard Command-S to save a document).

Once the program becomes familiar, most users begin to tire of having use the mouse to access commands that have no

Figure 1: The MecroMaker main dialog.

are hidden. If you use an extended keyboard, you can assign one of the function keys to the job. But those of you with smaller keyboards can use another method such as one of the keypad keys or a key combination using the Command or Option keys. Be sure to use a combination not already used by RSG/DS.

It's a good idea to refrain from using the keypad keys so that when you open the Calculator desk accessory while running RSG/DS, you can use the keypad with no conflicts. If you use the keypad keys for macros, it is best to use them in combination with other keys to avoid launching a macro when you operate the Calculator.

Step by Step

To create a macro, first make sure that MacroMaker and Macros are installed in your System folder (they are on the

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Picture Perfect!

Most DTP programs scale, stretch, rotate, and change a few attributes of graphics. RSG/DS have an entire integrated image processing utility for handling RIFF and TIFF images. The graphics Image Control dialog box (**Figure 1**) within the Edit menu is something that many people notice, but few ever use seriously. It contains terms and concepts that many people never explore. At the least they shy away from modifying graphics for fear of ruining the picture. As you will see, experimenting with the Image Control menu can be rewarding, and anything you do can always be undone.

INPUT	OUTPUT
10%	10%
20%	20%

A: Normal Contrast

10%	90%
20%	80%

B: Negative Contrast

Figure 3: Brightness control darkens or lightens the image.

Figure 4: Contrast changes the threshold between dark and light.

Important! Remember that no matter what image changes you make, you can reset the image to its original values at any time simply by clicking on the Normal button.

The journal for involved QuarkXPress users!

QuarkXPress In-Depth

VOLUME 1, NUMBER 7

Careful planning is crucial to getting it right the first time

■ IN-DEPTH ■ APPLICATION ■

Planning to Print

by Neil Oliveria

Desktop publishing can streamline the production process, shorten schedules, and save money. These goals are realistic, but elusive. Inadequate planning can eat up valuable time and money. In a worst case, the imagesetting of a project can deteriorate to a trial-and-error fiasco, and the printing can produce a result that is far below expectations.

This article focuses on the process and pitfalls involved with imagesetting and printing the final document. The *printer* referred to is the person(s) responsible for reproducing the document – either an in-house printing department or an external service bureau. We will also explore some of the advanced printing controls for color and graphics in QuarkXPress version 3.

Spend Time... Not Cash

The first rule for successful printing is to know your printer! Review the job with your printer early in the development. Supply the printer with laser printed proofs and test sheets. Learn the limitations of your printer's equipment.

Review fonts, colors, paper size, trim requirements, layout registration needs, dot resolution, and the myriad of other options. Don't wait until a large job is completed to learn that the printer's screen font for Helvetica (or another font) is different than the one you've been using. Provide the printer with files for all downloaded fonts used by your project.

One of the most common pitfalls in

continued on page 6

Publish with Style

It is surprising that style sheets are not more widely used. They're easy. If you find that you are constantly switching back and forth between fonts and formats in a project, then a few minutes spent in setting up style sheets can save a lot of time and tedium.

Style sheets let you group a complete set of character and formatting attributes under a single style name. Then you can apply those attributes to paragraphs by using the style name or a special keyboard combination that you specify. For example, you can specify that the *first paragraph* in a story will use a drop cap, fixed leading, no indents, and a specific font and size. Whenever you start a new story, selecting the style name for *first paragraph* will set up the complete format with one step, ready for typing.

Style sheets are also powerful tools for making sweeping changes throughout a document. When you create a new style, you can *base* it on an existing style. Then, when you change the base style, all of the

continued on next page

Figure 1

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* IDC, July 1990
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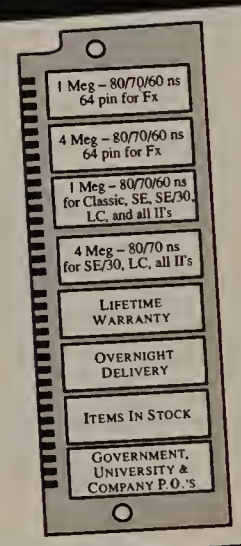

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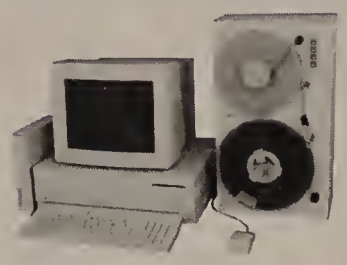

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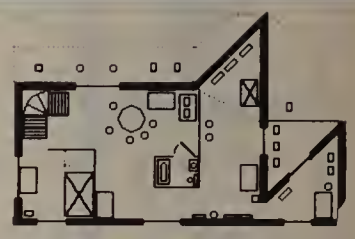

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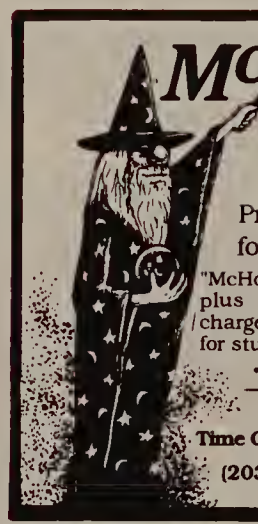

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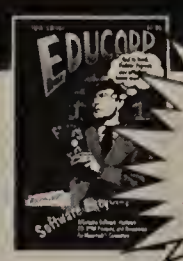

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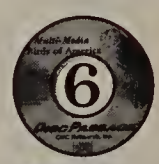

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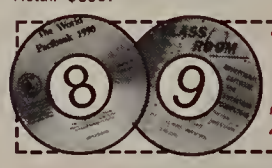

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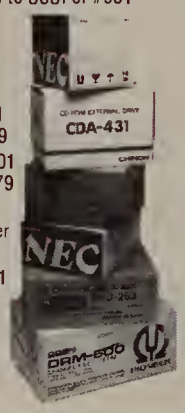

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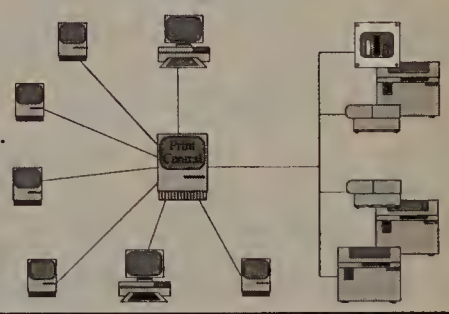

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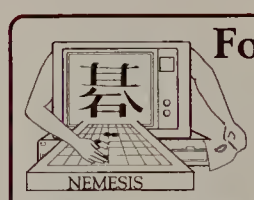

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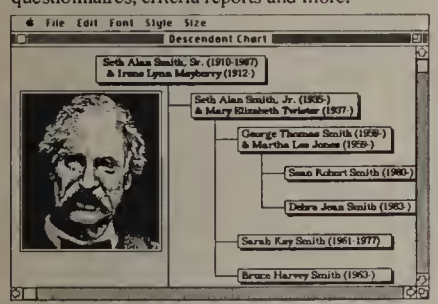

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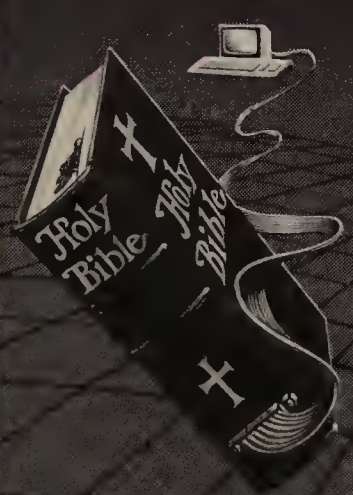

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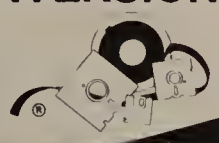

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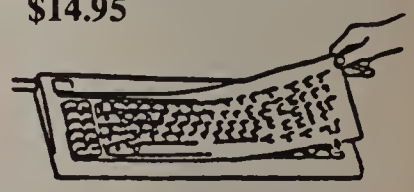

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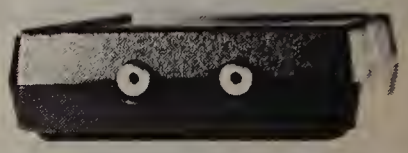

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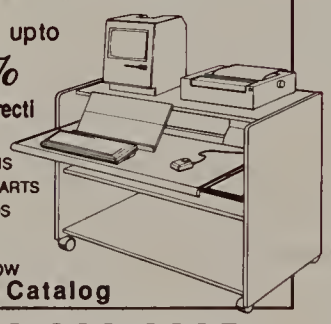

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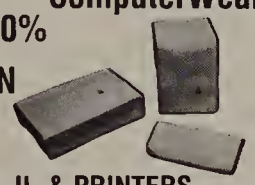

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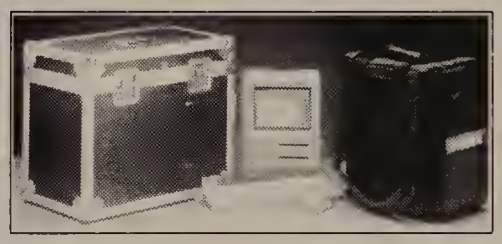

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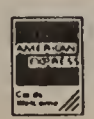

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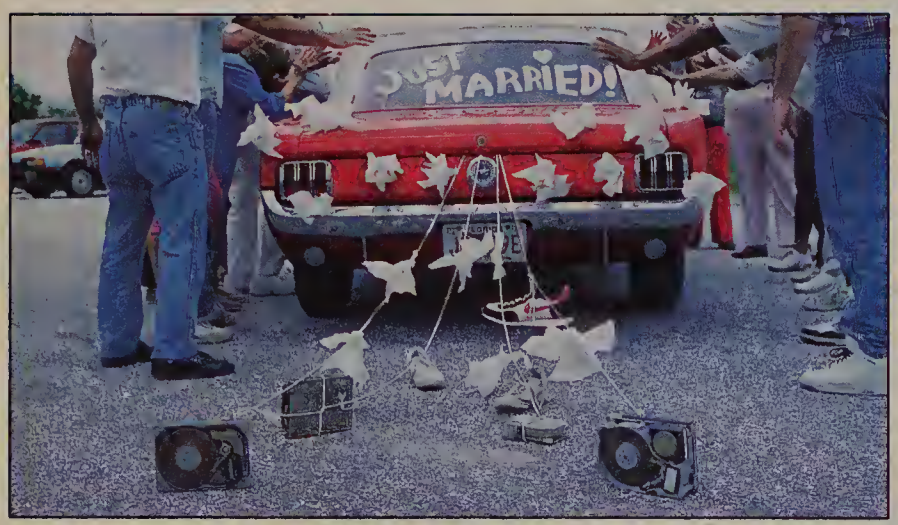

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BEST-SELLERS

BUSINESS SOFTWARE

Months on chart	Last month	This month		
78	1	1	**Microsoft Word**	Microsoft Corporation
69	2	2	**Microsoft Excel**	Microsoft Corporation
65	5	3	**Aldus PageMaker**	Aldus Corporation
57	4	4	**Microsoft Works**	Microsoft Corporation
30	3	5	**FileMaker Pro**	Claris Corporation
31	8	6	**QuarkXPress**	Quark
54	7	7	**MacWrite II**	Claris Corporation
17	9	8	**Quicken**	Intuit
30	6	9	**WordPerfect**	WordPerfect Corporation
23	10	10	**Adobe Illustrator**	Adobe Systems

EDUCATION SOFTWARE

Months on chart	Last month	This month		
3	1	1	**Kid Pix**	Brøderbund Software
32	5	2	**Where in the World Is Carmen Sandiego?**	Brøderbund Software
12	—	3	**Where in Time Is Carmen Sandiego**	Brøderbund Software
45	3	4	**Reader Rabbit**	The Learning Company
19	2	5	**Where in the USA Is Carmen Sandiego?**	Brøderbund Software

ENTERTAINMENT SOFTWARE

Months on chart	Last month	This month		
21	2	1	**Tetris**	Spectrum HoloByte
23	1	2	**SimCity**	Maxis
8	3	3	**SimEarth**	Maxis
15	5	4	**Welltris**	Spectrum HoloByte
47	—	5	**MacGolf**	XOR/PCAI

NETWORK/DATA COMMUNICATIONS

Months on chart	Last month	This month		
52	2	1	**AppleShare**	Apple Computer
57	3	2	**TOPS**	Sitka Corporation
13	—	3	**Timbuktu Remote**	Farallon Computing
11	1	4	**White Knight**	FreeSoft
15	5	5	**MicroPhone II**	Software Ventures

MASS STORAGE*

Months on chart	Last month	This month		
9	5	1	**UltraDrive 45**	GCC Technologies
2	—	2	**Micro/Stack 105**	MicroNet Technology
1	—	3	**UltraDrive 50S**	GCC Technologies
1	—	4	**Platinum 80MB (Internal)**	CMS Enhancements
2	—	5	**Micro/Removable MR45**	MicroNet Technology

ADD-IN BOARDS

Months on chart	Last month	This month		
7	3	1	**Macintosh IIsi NuBus Adapter Card**	Apple Computer
13	1	2	**Pivot**	Radius
11	—	3	**Macintosh Display Card 8•24**	Apple Computer
14	5	4	**Radius TPD Interface**	Radius
2	2	5	**FastCache IIci**	DayStar Digital

UTILITY SOFTWARE

Months on chart	Last month	This month		
19	1	1	**SAM II**	Symantec Corporation
13	2	2	**The Norton Utilities for the Macintosh**	Symantec Corporation
6	4	3	**After Dark**	Berkeley Systems
19	3	4	**SUM II**	Symantec Corporation
15	—	5	**Adobe Type Manager**	Adobe Systems

PRODUCT WATCH

Recent or forthcoming products of particular interest

Alias Sketch *Alias Research*
Three-dimensional freehand drawing software

Leafscan 35 *Leaf Systems*
High-resolution (to 4800 dpi) transparency scanner

ReelTime *Adobe Systems*
Low-cost digital video-editing software

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during July 1991.

*Does not include hard drives installed at the factory.

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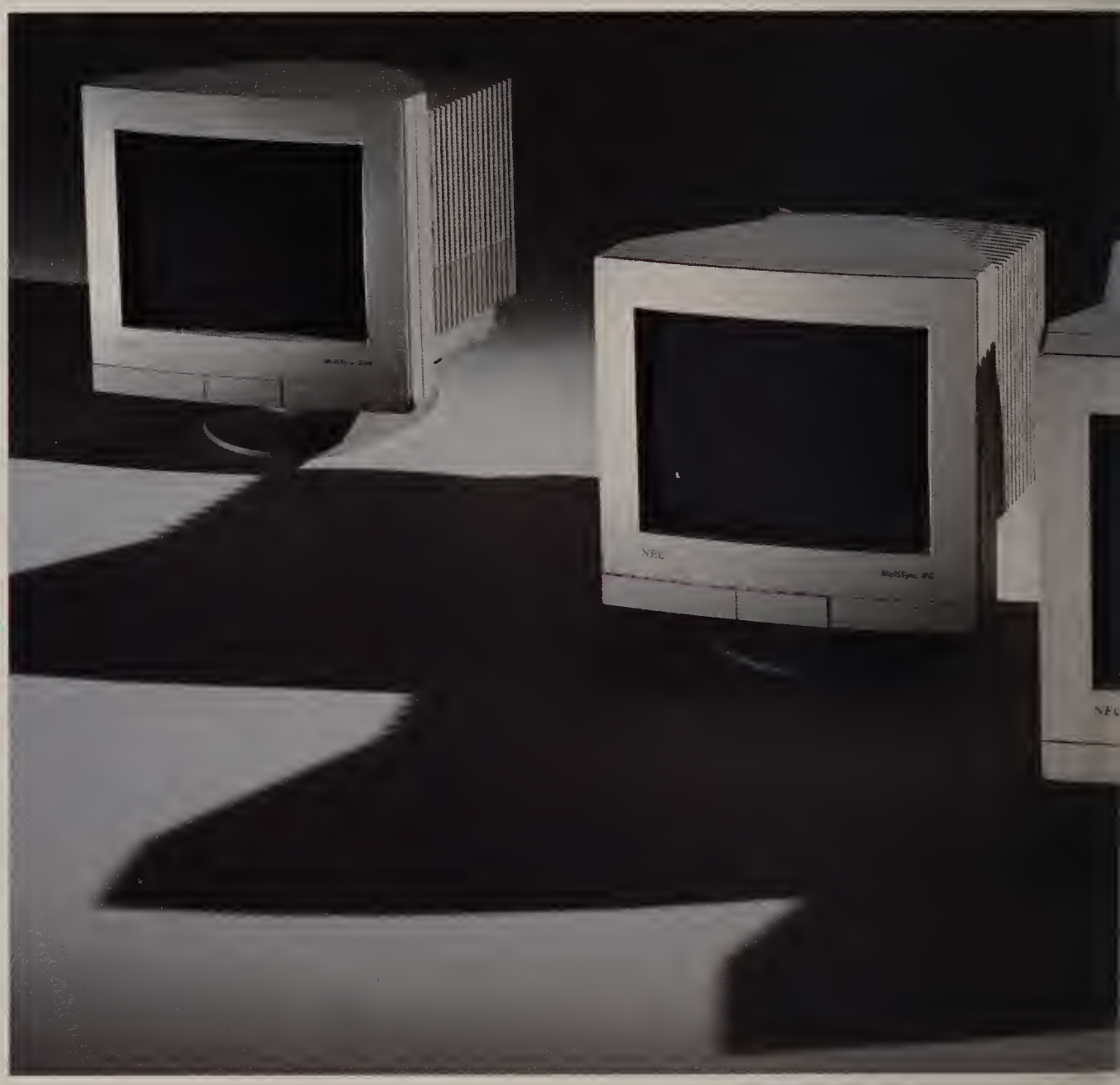

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Because the fit is customized, it covers your monitor like a mask. So light always passes through the filter, never around it.

And every one is made of durable, optical quality glass with unique anti-reflection and scratch resistant coatings.

The result?

Glare is reduced by 96%. Contrast and clarity are improved up to 20 times.

But anti-glare filters are ugly, you say.

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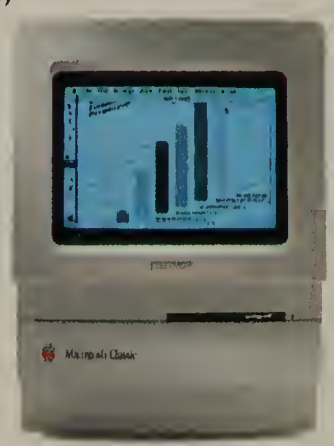

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Today, anti-glare filters play an important role in improving overall VDT safety conditions as defined by new federal and state legislation. (Eye fatigue, headaches and stress have all been linked to today's bigger and brighter screens.)

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